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AMERICAN RAILROAD JOURNAL, &c.

NEW-YORK, JUNE 21, 1834.

Should this number of the Journal fall into the hands of any gentleman who is not a subscriber, he is desired to consider it a modest invitation to become so, and to remit a \$5 bank note, and in return he shall receive the Journal commencing either with the 1st, 2d, or 3d vol., or at the middle of the 3d volume, which will be on the 1st July, and a receipt for the money. Let him look at the contents of this number, and then ask where he can get more practical and useful information for 6d. ? or where he can find a work that contains the same kind and amount of information for \$3 a year ?

Are the people in his neighborhood engaged in constructing railroads or canals, or M'Adam roads ? then in the Journal will they find something to aid and promote the cause. Does any new plan or method of constructing make its appearance, or excite action, some account of it may be found in the Journal. Allow me then to urge every one who reads this, that is not a subscriber already, to send his order at once, and it shall be supplied, either for past, present, or future volumes.

Bound volumes, in two parts, \$4—in one part \$3.50 ; stitched in paper cover \$3.25 ; forwarded by mail as published once a week, \$3.

The attention of our readers is called to the article on the Chesapeake and Ohio Canal, and to that on Steam, and Steamboats. They are both interesting.

HARLAEM RAILROAD.—The Harlaem Railroad commences at Prince street, in the Bowery, and follows the line of the 4th Avenue to Harlaem, $7\frac{1}{2}$ miles, 5 miles of which, to

Yorkville, are completed. The first part of it, or to 14th street, has a single track, laid in the most substantial manner on granite sleepers ; from 14th to 23d street, there is a double track, also on granite sleepers ; from 23d to 84th street, wooden sleepers are used, and a double track nearly all the way.

There has been much deep cutting ; in some places to the depth of 30 feet, through solid rock. Also some high embankments, especially a little south of Murray Hill.

This road was chartered in 1831, with a capital of \$350,000. Cars were first used on a part of it—to Murray's Hill—in June, 1833 ; they now run every half hour to Yorkville. Probably 150,000 passengers have rode upon it. The cars are elegant and commodious, drawn by horses. The fare for each passenger is 12 $\frac{1}{2}$ cents. When the road shall have been brought down to Wall street, as it should, and will be—when the citizens become satisfied that it is not only easier, cheaper, and far less dangerous than the omnibuses—thousands will ride where there are now only hundreds ; and thousands will ride out and take the fresh air, and a view of the green fields, who now never, or seldom, enjoy that luxury. It must and will be extended to Wall street, if not to the Battery, short of which it ought never to stop, so that those living at the extremes may interchange civilities without the expense of a hack, or the inconvenience of being jammed into an omnibus, and the risk of a race in Broadway with a rival line.

This road will, I have no doubt, great as the expense is, be a good investment, when completed, for passengers alone.

BURDEN'S BOAT.

Mr. Burden's Boat has been out twice since the drawing (see page 373) was taken, and each time has acquired a greater velocity than on its previous trial. It acquired yesterday a velocity of twenty-five revolutions of its wheel, of 30 feet diameter, per minute, or more than 20 miles per hour.

Not having been able to accept of Mr. Burden's invitation to accompany him on his excursion on Thursday, we avail ourselves of the following from a gentleman who was on board :

Another excursion was made yesterday on

the Hudson River, and the result fully bears you out in what you have before stated, "that Mr. BURDEN will accomplish all that he has professed to do." The boat went at the rate of more than 20 miles per hour. I will venture to assert that if a person was blindfolded, and put into the cabin, he could not possibly distinguish that he was on board any vessel, even if going at its greatest speed—no noise is heard from the working of the machinery—the entire absence of that tremulous motion so unpleasant in other steamboats, is a sufficient test of its improvement. Another advantage, and a very important one, will not fail to attract the notice of every reflecting mind—it causes no swell whatever in the river ; the smallest wherry can come alongside without inconvenience. It will be obvious how useful vessels similarly constructed will be on canals and narrow rivers. No injury will be done to the banks, which hitherto has been the chief obstacle to their introduction. And when it is taken into consideration, the extraordinary speed which can be accomplished by such a boat, we must come to the conclusion that it will confer great benefit on this country.

Mr. Burden is very sanguine of accomplishing all that he has promised. He is sole owner of the boat and of the patent. The contemplated arrangement with the Hudson river company last fall having been abandoned.

METEOROLOGICAL STONE.—A Finland journal gives an account of a singular stone in the north of Finland, where it answers the purpose of a public barometer. On the approach of rain, this stone assumes a black or dark grey color, and when the weather is inclined to be fair, it is covered all over with white specks. This stone is, in all probability, an argillous rock, containing a portion of rock-salt, ammonia, or salt-petre, and absorbing more or less humidity in proportion as the atmosphere is more or less charged with it. In the latter case, the saline particles, becoming crystallized, are visible to the eye as white specks.

FOSSIL HORNS.—In excavating the Lancaster Lateral Canal, near a place called the "Deep Cut," bones of extraordinary dimensions have been discovered. Among the curiosities found is a horn six feet in length, weighing 44 lbs., and measuring at the butt end sixteen inches. Also, a tooth weighing 6 $\frac{1}{2}$ lbs.

CHESAPEAKE AND OHIO CANAL.—The following interesting and valuable communication was duly received, but it has been detained for the purpose of publishing it in another form at the same time, to accompany the forthcoming *Railroad and Canal Map*—with which we hope to be able to give some particulars relative to other canals, as well as railroads, in the United States. The apology will, we trust, be satisfactory to our correspondent, and our readers also—who is particularly requested to continue his favors, as he may find leisure. Such communications will be found interesting and useful, not only in this country but also in Europe, where they will find their way if they are to be found in the *Journal*—(we say this without boasting.)

We may now, we think, again call upon engineers and other gentlemen, connected with railroads and canals in different parts of the country, to furnish us with similar statements of the works under their charge, or with which they are familiar, that we may be able to give a condensed account of them. It is that with which the public cannot be too familiar—nothing tends more to promote a useful object than familiarity with its details.

Statistical Facts in relation to the Chesapeake and Ohio Canal. To the Editor of the American Railroad Journal.

WASHINGTON, April 11, 1834.

SIR,—The following statistical facts, in relation to the Chesapeake and Ohio Canal, I have collected from the mass of documents which have been printed by Congress and the Company, and which amount in bulk to several octavo volumes. I have not, either, all of their reports to refer to, as the price of an entire copy of the proceedings of the board of directors and engineers costs now \$20 to \$25, and many of the papers are very scarce. Such as are given below will, I hope, answer your purpose. Alter them and change them as may best suit your views.

The general convention of Delegates from Pennsylvania, Maryland, Virginia, the District of Columbia, and one or two of the Western States interested, first met at Washington, D. C., in November, 1823, to determine on the proper measures to be adopted in reference to the successful prosecution of this great work of internal improvement. The first charter was granted by Virginia, in January, 1824, which was confirmed by Maryland in January, 1825, and by Congress in March of the same year. Pennsylvania granted her charter with some restrictions, (relative to portions of the appropriations of Congress being applied to the construction of the western section, &c.) in February, 1826. All four of these legislative bodies have since passed various acts, extending and restricting the powers of the Company.

SUBSCRIPTIONS.—Books were opened in 1826, after the confirmation of the charter by the several states.

Private subscriptions, - - - \$610,000

By Maryland, in March, 1826, - 500,000

Maryland, in 1834, granted \$50,000 additional: \$25,000 cash, and the remainder when a further subscription was made by Congress.

By Virginia, in 1833, - 250,000

Virginia had subscribed, in 1826, her interest in the Potomac Canal Company, which was then valued at 2 or \$300,000.

By Corporation of Washington, - 1,000,000

By Corporation of Alexandria, - 250,000

By Corporation of Georgetown, - 250,000

By Congress, - - - 1,000,000

The cost, as estimated by the U. S. Engineers

on the first surveys, was \$22,375,427.69; and, by Geddes and Roberts, the company's engineers, since that time, was \$9,347,408.69.

The projected route, (and in its location, thus far, it has deviated very little from the line originally laid out,) was up the valley of the Potomac river, as far as Cumberland; thence it follows the valley of Wills' creek, as far up as the mouth of Bowman's run, from which place it is to cross the summit ridge by a tunnel, railway, or inclined planes, as the company may see fit, the privilege of selecting being granted by their charter. (It is most probable that the company will adopt a railway with stationary power, as it will in the end prove the cheapest and most convenient.) The western course is thence down Castleman's river and the Youghagany, and the Monongahela, to Pittsburgh. (It is doubtful, I think, whether this line, the western section, will be adopted, as the United States have been projecting improvements on the Monongahela river, so as to render it navigable as far as Brownsville, 55 miles by the course of the river above Pittsburgh, and it will be shorter and more convenient to end at Brownsville than its present projected termination.) The total length of this projected route is 341 miles, 676 yards, and is divided into the eastern, the middle or mountain, and the western sections, the former extending from Georgetown to Cumberland, 185 miles, 1078 yards; the middle section, thence to the mouth of Castleman's river, 70 miles, 1,010 yards; and the latter thence to Pittsburgh, 85 miles, 348 yards.

DIMENSIONS OF THE CANAL.—The size of the Erie canal was at first adopted as sufficient for the Chesapeake and Ohio Canal. But this idea was soon abandoned, and the following size determined on: 60 feet wide at surface, 42 feet at bottom, and 6 feet deep,

giving a cross section of 366 feet. But for the purpose of giving sufficient water for manufacturing purposes, the first two miles above Georgetown were widened to 70 feet, with a depth of 7 feet, and the succeeding two miles have a width of 80 feet, and 7 feet depth. Between Harper's Ferry and the Point of Rocks, in some few places, and for short distances, it has been narrowed to 50 feet, and above Harper's Ferry it has been widened to 90, 100, 120, and even 150 feet, in several places. The locks are 100 feet long by 15 wide, in the chamber, and 6 feet deep. The tow paths are 12 feet wide, and the berm bank 8 feet. All the culverts, aqueducts, and locks, are built of solid stone masonry, laid in hydraulic lime. Many of the locks are so constructed, by lengthening the side culverts and multiplying their outlets, as to be filled in one half the usual time.

In November, 1830, the sections extending from the Seneca feeder to the termination of the old canal, around the Little Falls of the Potomac, (a distance of 17 miles and 774 yards,) were finished and opened for use. The sections in Georgetown were finished in August, 1831. The sections from the Seneca feeder to the Point of Rocks, (a distance of 26 miles and 363 yards,) were open for use in the spring of 1832, and by the end of 1833 it was completed as far as Shepherdstown, (72½ miles from Rock Creek Basin, Georgetown.)

Between the Georgetown Basin and the Point of Rocks, a distance of 48 miles, 118 yards, is a rise of 217 feet, overcome by 27 locks: for the lift and distribution of which see table given below. Between the Point of Rocks and Williamsport, (to which the canal will be open from Shepherdstown this spring or summer,) a distance of 66 miles and 762 yards, is a rise of 136 feet, overcome by 17 locks: see table.

No. of lock.	Lift.	Construction.	Distance from lock to lock.	Total distance from tide lock.	Remarks.
			m. yds.	m. yds.	
Tide 1.	3 ft.	Cut stone. Free stone.			
No. 1.	8	Same as tide lock.	661	601	In the locks of 8 feet lift, there are about 1,084 perches of masonry; each 4,436 superficial feet of ashlar (excluding coping and hollow quoins); 436 lineal feet of coping, 1 foot thick by 3 feet wide, making 4 feet of cut work for every foot lineal; and 61½ feet rise of hollow quoins: where the cut stone are exactly of the size required by the specifications, there are 384 perches of cut stone and 700 perches of backing. The quantity of cement for each lock of 8 feet lift, has varied from 3,000 to 3,300 bushels.
2	8	Same.	814	7424	
3	8	Same.	1004	843	
4	8	Same.	98	941	
5	8	Partly of hammered and partly of cut stone.	4 909	5 90	
6	8	Same. Free stone.	637	5 737	
7	8	Cut, granite, and free stone.	1 1075	7 42	
8	8	Red sand stone. Cut.	1 594	8 636	
9	8	Granite and free stone. Cut.	604	8 1240	
10	8	Cut stone. Granite.	153	8 1393	
11	8	Cut. Red sand stone.	319	8 1712	
12	8	Cut stone. Granite.	545	9 497	
13	8	Same.	148	9 645	
14	8	Granite. Cut.	148	9 793	
15	8	Red sand stone. Cut.	3 1740	13 773	
16	8	Same.	311	13 1084	
17	8	Same.	618	13 1702	
18	8	Same.	178	14 120	
19	8	Same.	134	14 252	
20	8	Same.	198	14 452	
21	8	Same.	2 623	16 1075	
22	7	Same.	2 1544	19 859	
23	84	Same.	2 856	21 1715	
24	84	Same.	1174	22 1129	
25	84	Same.	8 23	30 1152	
26	8	Same.	8 1137	39 529	
27	8	Same.	2 20	41 549	
				48 118	
28	6	Granite transported on Balt. & O. Railroad, and flint (hard white) stone from neighborhood. Cut stone.	1337	48 1415	The masonry of lock No. 24 is connected with the lower abutment of the Seneca aqueduct.
29	7	Balt. granite. Hard white flint. Cut.	1 1597	50 1292	
30	8	Potomac granite 1-7 and red sand stone. Cut.	4 143	54 1435	
31	8	Granite and flint from neighborhood.	3 121	57 1556	
32	8	Granite & lime stone from neighborhood. Cut.	2 332	60 128	The foot of lock No. 33 is connected with the abutment of the bridge over the Potomac at Harper's Ferry.
33	8	Lime stone. Cut work.	760	60 888	
34	8	Same.	1556	61 684	
35	8	Same.	1207	62 191	
36	8	Same.	173	62 364	
37	9	Same.	4 909	66 1273	The cost of lock No. 35, as well as that of 36, 37, 38, 39, 40, 43 and 44, (8 in number,) was at the rate of \$1,130 per foot lift. This was including gates and foundations.
38	5	Same.	5 1436	72 919	
39	6	Same.	1 297	73 1236	
40	9	Same.	6 447	85 940	The two locks, Nos. 41 and 42, are constructed of Lawrence dressed lime stone; were built for \$800 per foot lift, including gates and foundations.
41	10	Hammered stone. Lime stone.	6 1740	92 920	
42	9	Same.	200	92 1130	
43	9	Lime stone. 3 miles transported. Cut stone.	200	92 1330	
44	10	Same.	6 1020	99 580	Total lockage, 353 feet, from the Georgetown basin.

Besides the above 44 lift locks, a communication with the river Potomac is to be effected through the guard locks at the entrance of the feeders from the Potomac, and also through the several lift locks designed for the Virginia trade, and constructed in compliance with the Virginia charter. Four of these locks are required to be constructed similar in size and construction

to the other lift locks of the canal, viz.: one opposite the mouth of Goose creek, which enters the Potomac, opposite the foot of lock No. 25; another at the Point of Rocks; another opposite Shepherdstown; and the 4th, near the mouth of Opequon. The latter has since, however, been dispensed with, as its purposes are subserved by the transfer of locks Nos. 41

and 42, (which were located 2 miles above the mouth of Opequon,) to 2 miles below the mouth of that river. (This transfer reduced the slack water navigation, between guard lock No. 3 and lift lock No. 41, from 7 to 3 miles, and increased the expense \$100,000. There is also a lift lock in addition to the above constructed, connecting with the Potomac opposite the junction of the Shenandoah with the Potomac at Harper's Ferry, 637 yards above lock No. 32. It has 10 feet lift, and is, in other respects, similar to the other locks.

Culverts.—Below the Point of Rocks there are, inclusive of roadways, 59 culverts, of which the total cost was \$110,000. Three of these culverts are of 12 feet span each, 2 of 16 feet span each, (one over the Tuscarora, 2 miles above the Monocacy aqueduct, and the other 1 mile below the Point of Rocks,) and 1 of 2 arches of 16 feet span each over the Little Monocacy river: the total number of perches of masonry in these 59 culverts amounts to —, costing \$51,872—32 culverts, nearest Point of Rocks, 11,357, \$50,000. Between the Point of Rocks and Harper's Ferry the number of culverts is 19, containing in all 6,839 perches of masonry, and the total span of which was 158 feet. There are, also, above Harper's Ferry, 41 culverts, the estimated price of which was \$44,300. The culverts below Harper's Ferry are generally 110 feet long; while above, owing to the contraction in the width of the canal, they do not exceed 100 feet.

Aqueducts.—No. 1. Seneca aqueduct, built of red sand stone from the immediate neighborhood, is 114 feet long between the abutments, which, with the 2 piers, rest on a solid foundation. There are 3 arches of 33 feet each. Cost \$22,784.

Aqueduct No. 2. Monocacy aqueduct, built of a white granite stone, (obtained within 3 miles of the site of the aqueduct,) is 438 feet in length between the abutments, and is 516 feet from end to end of the wing walls which project from them. There are 7 arches of 54 feet span each, and 9 feet rise, (segments of circles,) the radius of intradoes of which is 45 feet. It contains 9,788 perches of masonry, (exclusive of the rough walls in which the cut masonry of the wings terminates.) Cost, \$125,000.

Aqueduct No. 3 crosses the Catoctin, a tributary to the Potomac; it has 3 arches, a semi-circular, of 20 feet span each, and the third a semi-ellipse of 40 feet span and 10 feet rise, supported on piers, 6 feet wide by 33 feet long, while the parts under water (7 feet in depth,) are 8 by 35, and founded on solid rock. Total cost, \$33,500.

Aqueduct No. 4 is over the Antietam, a branch of the Potomac, entering 3 miles above the Government dam above Harper's Ferry. The abutments are 9 feet thick, and 108 feet apart. It has 3 semi-elliptical arches, 2 of 28 feet span, and the 3d of 40 feet span, with a rise of 10 feet each. The foundations of the piers and abutments are on solid rock. Greater portions of them are of cut stone masonry and expensively built. Lime stone from the neighborhood used. The towing path parapet is 7 feet thick at bottom and 6 at top. The berm parapet is 5 feet thick at bottom, and 4 at top. Width of track is 20 feet at bottom and 22 at top. Cost, \$22,850.

Aqueduct No. 5 is over the Conococheague, which enters the Potomac at Williamsport. It has 3 arches of 60 feet span each; two piers and two abutments. The piers are 12 feet thick at the base. The arches are 32 feet wide and 15 feet rise.

Tow-path parapet, 7 feet thick at bottom, 6 at top; berm parapet, 5 feet thick at bottom, 4 at top.

The walls are raised 7 feet above the bottom of the canal.

Estimated cost, \$40,260. Not quite finished in December last.

Feeders.—No. 1. The Little Falls feeder supplies 4½ miles of canal. An arched stone dam is thrown across the Potomac, and the admission of water into the canal is regulated by a

single guard gate, and enters at the foot of lock No. 5. Length of the dam, 1750 feet, height 4 feet. Cost —. The feeder is a part of the old canal around the Little Falls, constructed previous to 1800.

No. 2. The Seneca feeder supplies 17 miles, although at the foot of lock No. 18, at the Great Falls, an additional supply is received from the Potomac, through a small arch under the towing path. The dam across the Potomac for this feeder is — feet high, and 25,000 feet in length, and cost —. The water is admitted into the canal through guard lock No. 1. The dam is of stone and arched.

No. 3. The canal for the next 40 miles depends almost entirely for water on the supply it receives from the Potomac at the head of Harper's Ferry Falls. The dam constructed by the Government for the use of the United States armory at Harper's Ferry answers all necessary purposes here, and no more water is drawn off than was formerly used by the old canal, which has been closed since the opening of the main canal. (A small feeder from the Tuscarora, which enters the canal 17 miles below the head of Harper's Ferry Falls, also assists towards supplying this section.) The water from the Harper's Ferry feeder is admitted through guard lock No. 2, situated near lift lock No. 35. This dam is — feet high, and — feet long. Cost of company's works here —.

No. 4 supplies 23½ miles of canal. The dam across the Potomac is near —, and is 20 feet high, and 810 feet long, and 60 feet base. The water is admitted into the canal through guard lock No. 3, which is 1 mile 320 yards above the dam. Cost of dam, lock, and other works connected with the feeder, —.

No. 5 feeds 19 miles of canal, and is situated 8 miles above Williamsport. The dam across the Potomac is at —, and is 20 feet high, 706 feet long, and 20 feet base. The water is admitted through guard lock No. 4, 320 yards above the dam. Cost —.

Some facts I have not here been able to find out, but which I hope you will be able to obtain, should they be of any service.*

Costs.—The following work, done between the Point of Rocks and the Georgetown Basin:—Common excavation, 1,893,666 cubic yards; Hard pan do., 439,071 do.; Quarry rock do., 75,472 do.; Rock blasted, 398,524 do.; Embankment, 1,533,850 do.; Puddling, 96,092 do.; Walling, 231,064 cubic perches. Costing \$1,032,161; for grubbing, \$12,892; extras, \$40,800.

Extra on this section:—Pier, basin, and tide lock, at Georgetown, \$78,943; Locks, \$232,642; Lockhouses, \$16,315; Bridges, \$32,925; Aqueducts, \$23,444; Culverts, \$51,872; Waste weirs, \$8,619; Dams, \$30,491; Guard locks and feeders, \$15,404; Improvements, \$22,002.

The masonry on the dams, locks, aqueducts, pay for engineers, officers of the company, &c. are not included in the above. Items given separate.

Work done and to be done from the Point of Rocks to Williamsport—all under contract, and a great portion finished:—Common excavation, 2,733,905 cubic yards; Rock do., 433,752 do.; Slate do., 8,140 do.; Embankment, 1,350,149 do.; Puddling, 37,617 do.; Walling Stone, 181,029 cubic perches. Actual and estimated cost of the above, \$936,735.74; for grubbing, \$9,653; extras, \$8,564.13. Total, \$954,952.87, besides the masonry on locks, aqueducts, culverts, bridges, &c. &c.

I have not been able to obtain a full aggregate amount of the expenditures of the company, nor an actual statement of the entire cost of the canal. It has had to meet enormous law expenses on account of its difficulties with the Baltimore and Ohio Railroad Company; besides being subjected to very large losses in the delay occasioned by the injunction of the Chancellor of Maryland in the above case. The right of passage, too, over the various lands of private individuals has cost immense sums.

* We have not been able to fill the blanks.—Ed. A. R. J.

The pass at the Point of Rocks, held in dispute between the two companies, was \$11,153 feet long, or 2¼ miles. The distance from Harper's Ferry to Cumberland, according to Geddes and Roberts' report, is 127 miles, and the amount of all the narrow passes where the works would come in collision would amount in all to 45 miles.

The reports of the united engineers, who have been at various times invited by the company to inspect the different portions of the work, are all declaratory of the perfect and substantial manner in which the work has been constructed throughout. These reports, have been called for by Congress, and, on being submitted, have been ordered to be printed. They contain a great deal of information relative to this grand work, and are worthy of perusal. This spring, notwithstanding the many delays and difficulties of the most arduous and imposing nature the company have had to contend with, will see the canal opened some distance above Williamsport, a distance of 102 miles of canal, and 14½ slack water navigation, fully complying with the charter, which required upwards of 100 miles to be completed within 5 years from its commencement, or rather from October, 1828. Some report I have just got hold of, says the entire cost of this construction was \$3,650,000, of which \$450,000 was expended from Little Falls down.

I can add that the prospects of the canal are truly encouraging. Having command of an extensive coal region, and passing through a highly cultivated valley, where there are also numerous grist and other mills, and abundant mineral resources besides the coal, they can never be at a loss for means of rendering the canal profitable. They cannot experience much competition, either from the Baltimore and Ohio Railroad, on account of the heavy weight of the produce to be conveyed, and cheapness of conveyance on the canal. The Washington city branch of the Chesapeake and Ohio canal extends from the Rock Creek Basin on the western borders of the city to the mouth of Tiber Creek, following the bend of the river Potomac, (being constructed along the bank of that river, and in some few places encroaching on the river itself,) a distance of 1 mile and 373 yards. A tide lock at the eastern termination brings it to the level of the Potomac. The cost of this branch was \$25,978.47.

Very little has yet been done on the Alexandria branch of the canal. Congress has made an appropriation of \$60,000, I believe, for the construction of an aqueduct at Georgetown, across the Potomac, for the transfer of the canal to the Virginia shore. The length of this branch is 7 miles and 416 yards, and the estimated cost \$372,204.55. The aqueduct has been contracted for some time since, and is now in progress of construction under the superintendence of Capt. Turnbull, U. S. topographical engineer. It is 1714 feet long; the canal way is to be 16 feet wide at bottom, 18 feet at top, and 5 feet deep, and thence, to Four Mile run, the size of the canal is to be 32 feet wide at bottom, 50 feet at top, and 6 feet deep. At the embankment, at Four Mile run, it is to be 18 feet wide at bottom, 36 feet at surface, and 6 feet deep. Thence to Alexandria it is to be enlarged to the established dimensions of the Chesapeake and Ohio Canal.

H. N. C.

P. S.—We have received the communication promised, giving the rates of toll on the canal, which will be given in our next.

The Undulating Railway—Final Reply of Mr. Badnall to Mr. Cheverton. [From the London Mechanics' Magazine.]

Sir,—Mr. Cheverton's dreadful infliction—his rod—hath, at last, fallen upon me, without his own character, or the good taste of your readers being, in the slightest degree, "ill-con-sulted"—without the most distant apparent inclination to render your pages the medium of a personal quarrel between himself and me! He

will not descend to imitate my dull, vituperative style! He would shudder to characterise an opponent as "a coarse practitioner from the abattoir!"—"a mere hacker of flesh and bones!" He is a man of more gentlemanlike bearing than to fume out false accusations! No, Sir, he stands upon too lofty an eminence! His philosophic and refined understanding could not possibly stoop to mere personal abuse, or controversial subterfuge! No, he is the very prototype of wisdom!—an immortal emblem of refinement!—a breathing picture of urbanity and peace!—gentle as a lamb—sweet as honey—mild as new milk—"parfaite amour" in toto! He is not the cur who, when he meets with an unflinching antagonist, flies growling and barking to his kennel! He is not the tame-hearted pugilist who swears that a blow is false because he cannot parry it!—nor is he slippery as the eel, which, by its twistings, and its twinings, and its slime, evades the grasp of its pursuer, and buries itself in its native mud! No, Sir, Mr. Cheverton is a being of far different stamp!—his mental qualifications—his scientific reputation—his temper—his writings—his sentiments—will all bear the test of the most rigid scrutiny! His theories will all be established by practical results! The halo round his head will brighten as each opinion becomes confirmed by experiment! In a word, his letters on "the undulating railway," while they will immortalize the fame of the *Mechanics' Magazine*, will become never-dying monuments of sterling talent and correct observation, from the hour when that trial takes place, which a Dalton* has been indiscreet enough to recommend! Till that hour arrives, I almost feel inclined to "leave him alone in his glory," in order that I might, with double effect, magnify his transcendent name, and prostrate myself before his living monument of wisdom! But—I cannot resist the inclination which his letter has excited, to pay him some passing homage; for neither the "war-whoop of the Mohawk," nor the "inspiring blast of the clarion," shall be compared to the sounding of his brass, or the tinkling of his cymbals!

Yet how shall I, to whom "nature has been so niggardly," sufficiently extol the praise of one who, declining to quarry all ignoble game, is able to defend himself against a weapon capable of dividing "soul from body," the very "marrow from the bones!"

Immortal champion! inspired philosopher! tender and kind-hearted victor! may this humble panegyric be a memento of my deference to thy fame, as long as the *Mechanics' Magazine* may survive the wreck of time—and may that be for ages!

Having thus, Mr. Editor, in sincere good humor, squared one part of my account with Mr. Cheverton, I beg to acknowledge, like him, the gratification which I feel at the prospect of this too lengthened controversy being terminated. The venom which he thought it prudent, in the first instance, to cast on me, I good-humoredly endeavored to throw back; but his last effusion was of so different a nature—so characteristic of a noble and unoffending disposition, that I have met, as it deserved, with an unbounded expression of veneration. As you have admitted, in your valuable columns, his unmeasured declamations, I trust that equal justice may be done to me; and that you will, by publishing this reply, permit me the opportunity of proving that he who cannot, by fair and manly argument, defeat a literary or scientific opponent, stands little chance of doing so by an opposite course of conduct.

Such was my object in noticing Mr. Cheverton's extraordinary letter (vol. xx. p. 73). Had it been otherwise, my silence should have shown my contempt for the vulgar sneers and false accusations with which that document abounded. But it is passed, and I congratulate Mr. Cheverton on the victorious result of his attack.

* Alluding to the trial of the undulating railway, which Drs. Dalton and Lardner have recommended to be instituted on the London and Birmingham line.

As no unnecessary time will now be lost in trying, by ample experiment, on some line or other, the merits of the undulating question, I would propose, to your readers in general, that all further controversy should rest until the experiment be made. Practice can alone determine whether I or my opponents have been right or wrong in our anticipations, and whether Mr. Cheverton's arguments or mine will be creditably substantiated. The note which you have attached to my last communication leads me to hope that you may concur in my present opinion; and if so, while Mr. Cheverton may try at his leisure any further experiments he may please at the National Gallery of Practical Science, I will direct my attention to the means of elucidating the problem in a far more satisfactory way. If, on a trial being made, I find myself in error, I will frankly confess my incompetency to argue this subject, and my folly at having so warmly and so boldly espoused it—if otherwise, I trust there are many of your readers who will give me credit for some patience, and for some intellectual capabilities beyond the *canaille* sphere in which Mr. Cheverton has been so anxious to place me.

The test shall not be less difficult than I originally proposed. Whether the experimental railway be 6, 8 or 10 miles in length, I maintain that any locomotive engine will traverse an undulating line, with a load which is its maximum load on a level, in half the time which it will occupy in traversing the same distance with the same load on a dead level railway, and without greater waste or consumption of fuel. And I, moreover, say, that any locomotive engine will traverse an undulating line at a great velocity with a load which that same engine cannot move upon a level line.

Whenever this trial may take place, your readers shall have ample notice of it; and if you, Sir, will undertake the office of umpire, I shall cheerfully abide by your decision.

In the meantime, it would be mere repetition, and an unnecessary prolongation of our arguments, were I to reply at length to the more solid parts of Mr. Cheverton's last letter. One or two points, however, I cannot help touching upon. First, as to "locomotive duty," which he so frequently harps upon. All my arguments, of late, have been almost confined to the practical consideration of locomotive duty. I do say that by employing gravity as an auxiliary force, we save locomotive power. What! Mr. Cheverton exclaims, can you take advantage of gravity without being obliged to repay what you borrow? Yes, is my reply—and yet no perpetual motion, Mr. Cheverton! How? Mr. Cheverton would ask. My answer is simply this, and whether it be true or false, experience will prove—velocity is gained by taking advantage of gravity. Friction on railways is, in my humble opinion, not as the spaces, but as the times or velocities. If this be true—and if a greater velocity be attainable on an undulating than on a level railway, there is, (exclusive of any difference in friction arising from the particular inclination of the plane,) less friction on an undulating than on a level railway. Locomotive steam power is therefore saved.

The next point I wish to allude to, is Mr. Cheverton's observations about a lecture given to me, or some of my acquaintances, by Professor ***** in the National Gallery. Does he mean Professor Ritchie?—if so, I was not present. That gentleman and Mr. Locke had, I know, a conversation together; but the only time that I have had an opportunity of conversing with Professor Ritchie on the subject, was

* We do perfectly; but it must be with reservation to the claims of Mr. Whitehead and Mr. McKinnon, to whose papers, in opposition to the undulating system, (now many months in hand,) we stand pledged to give insertion. We shall be glad to have their assent to the proposed postponement in the text.—Ed. M. M.

† It will occur to your readers that I have frequently stated as my opinion, that an engine would convey, on an undulating line, at least twice the load which the same engine could move on a level, at the same velocity. Such is my opinion now; but the test which is above proposed will, I am sure, be deemed sufficient to decide the question at issue, and it will be found to accord with the terms of my original challenge.

recently, when he did me the honor to spend part of the day with me in Liverpool. In a word, the only individuals whom I can call to mind as having expressed a decided opinion in my presence, when in London, adverse to the undulating railway, were Mr. Saxton and a friend of his, whom I begin to think was Mr. Cheverton; and as to any acquaintance of mine then present being afraid of their "badgering," I rather think Mr. Cheverton has imbibed an erroneous impression. If it were necessary, I could publish, in this letter, a list of persons who are advocates of the undulating railway, amply sufficient to out-balance the strongest testimony which Mr. Cheverton and his friends can advance against it,—but the best testimony is practice, and upon that I throw the merits of the case.

Lastly, Mr. Cheverton offers some important practical objections, which I confess to be more worthy of notice than any points which he has hitherto advanced. But, serious as they appear, they will not, on consideration, be found of any real weight. In the first place, we have to determine what is a safe velocity—that being determined, how can it be attained on a level railway with heavy loads? Unless gravity be employed at starting, as an auxiliary force, a much more powerful engine would be requisite to move a heavy load from a state of rest, than to continue it at a given maximum velocity; and if gravity be employed at starting, the engine and load must ascend again to a like summit, in order to maintain the starting advantage; and if so, what is this but an undulating railway? Does Mr. Cheverton imagine that a perfect cycloid, or a perfect arc, alone constitute my idea of an undulation? Far from it—he may descend a hill, run four miles on a level, and ascend to an equal elevation; and by doing this would realize a system of undulation which might, probably, be adopted with advantage in some cases; for, with heavy loads, a velocity might be generated by the first descent which could not, with the same engine, be generated on a dead level; and this being maintained on the level, would enable the load to ascend to a like elevation. But supposing the undulations to be a series of regular segments of circles, wherein consists the difficulty of sustaining an average velocity of 20 or 30 miles per hour, without an increase of speed? Is it necessary to work the engine down every descent? One of the leading advantages which I anticipate is the great saving of that steam expenditure which is now necessarily incurred in maintaining high velocities on a level. Again, it will require very powerful engines to attain high velocities, with heavy loads, on level railways: whereas, such powerful engines will not be so necessary on undulating railways, and for the reasons previously stated.

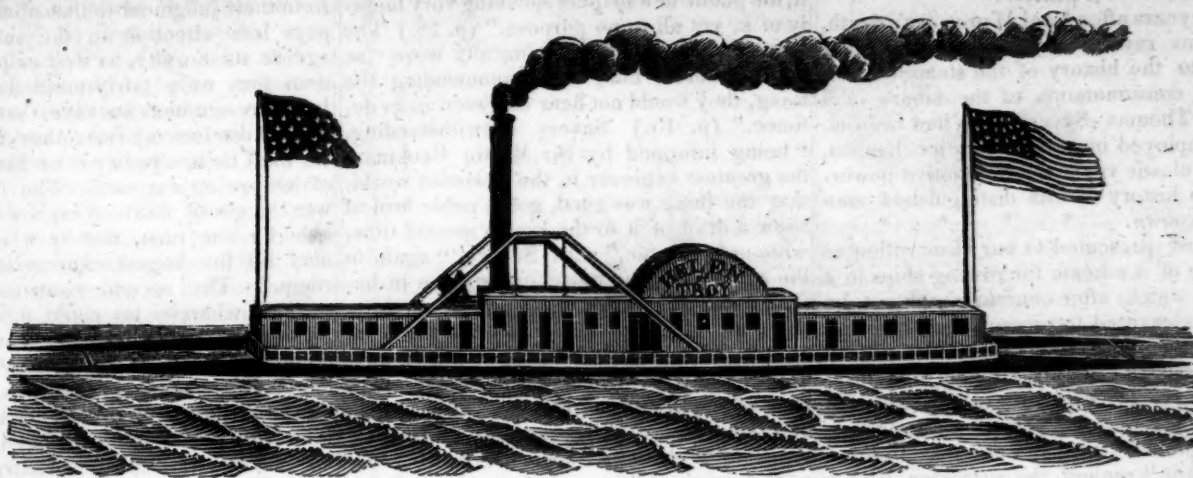
I now, Sir, unless again attacked by Mr. Cheverton, close with pleasure this twelvemonth's warfare, anxiously awaiting the result of practical trials; and sincerely hoping, although a few waspish observations have occasionally intermingled with a subject to which they should have been altogether foreign, that some information and benefit may have been derived from the discussion.

I am, Sir, with great respect, your very obedient servant,

Douglas, March 27, 1834.

R. BADNALL.

P. S.—S. Y. and I have, in one respect, misunderstood each other. He is certainly right in believing that the pressure upon an inclined plane, (alluding to the force necessary to draw a body up,) is as the base to the length: therefore, at an angle of 45°, my statement appeared erroneous; but, taking into consideration the resolution of the forces—that at an angle of 45° the length of the base is equal to the perpendicular elevation—and that taking the length of the plane as the entire force of gravity, it forms the diagonal to two equal sides of a square; the oblique forces are therefore equal—that is, at an angle of 45°, the force of gravity which urges a body down a plane, or retards its ascent, is exactly equal to the force of pressure on the



plane. For instance, if L be the length, B the base, and E the elevation, at an angle of 45° E is equal to B ; and although the pressure on the plane is $\frac{B}{L} \times L$, yet the tendency to descend is $E \times L$; the one force, therefore, is equal to the other. I close my discussion with S. Y. with every feeling of respect.

[See page 384.]

MACHINE FOR EXCAVATING EARTH.—Mr. G. V. Palmer, of Worcester, has been ten years and upwards engaged in constructing an extraordinary engine to excavate earth, &c. for which he has taken out a patent. This engine works by steam, and is particularly adapted for cutting canals, levelling hills for railways, and removing large masses of earth. The engine cuts, at a single blow, six feet in width and three feet in depth—delivering on either side, or into carts, one ton and upwards per minute: it also cuts and sifts gravel in the same proportion for road-making. We understand it is of great simplicity of construction, and the weight of the engine does not exceed three tons.—[Manchester Courier.]

We copy the following from the forthcoming number of the Mechanics' Magazine:

BURDEN'S BOAT.—This "wonder of the age" made its second trial on Wednesday last, June 10th. We have all along expressed our conviction that Mr. Burden has stated nothing that he will not accomplish; we think so still, and so does every practical man we have conversed with on the subject. But we do hope, that Mr. B. will not allow his anxiety to realize his promises interfere with his judgment, or in any way prevent his doing that which he has promised to accomplish, WELL. We insert the annexed engraving as a correct representation of it, and take this opportunity of introducing to the notice of our readers a condensed account of steam engines and their inventors, compiled from authentic sources. In a few days she will make her first trip to Troy.—[ED. MECH. MAG.]

The Great American Steam-Raft of English Origin. By ALFRED CANNING. [From the London Mechanics' Magazine.]

SIR,—Having noticed in your Magazine for Saturday, 22d ult., an account of a raft propelled by steam, considered to be the invention of a Mr. Burden, in America, I think it due to myself to state, that in 1817 I conceived the idea of constructing a raft

similar to that attributed to Mr. Burden, with this difference, that the bows of my floaters were to be considerably more elevated than those of Mr. Burden's raft. The following year, being in Paris, and foreseeing the probability of being detained there for a considerable time, I set about constructing my raft. I took two deal planks, of 30 feet long each, 12 inches wide by 6 inches thick, and having fashioned each like a canoe, I placed them on edge, parallel with each other, about 5 feet asunder, and connected them together at about 3 feet from the surface of the water, by a decking resting upon 4 stanchions, of about 7 feet long, which rose nearly 4 feet above the deck, and served to support a handrail, as well as to maintain in square the whole frame-work, by diagonal ropes, which passed through holes in the tops of the stanchions and holes in the deck. I tried this little model raft, both with oars, a sail, and paddle wheels (worked by the feet), and found that I was not deceived in my expectations of its speed, which was astonishing. I had a rudder of sheet iron, in the shape of a fish tail, adapted to each side-piece or floater, which were connected together and acted upon by diagonal cords and a cross-bar. Prince Joseph de Chimay, his sons, and several other persons of high rank, witnessed my trials. Finding it succeeded so well, and possess so many advantages over every description of boat, as it was not liable to sink or upset, &c. &c. I determined to construct a much larger raft, and propel it by steam; but owing to the jealous spirit of the boat owners on the Seine, particularly Prosper-Colin, and Daguet, who had great influence with the Prefect, I was not able to procure a permission to place it upon the river. Being immediately afterwards obliged to absent myself from Paris upon urgent business, I left my model raft afloat, in the care of a waterman, who lived in his barge upon the Seine, at the foot of the Pont Royal, directly under the windows of the royal palace of the Tuileries, one of the greatest thoroughfares in Paris, where it remained for five months. Upon my return, the waterman (Laporte) informed me that several foreigners, particularly Americans, had made repeated inquiries respecting the nature of the raft, and that two American gentlemen had made drawings of the raft; and had observed, "that rafts constructed upon the same principle would suit well the lake navigation in the United States."

Should you, Sir, or any of your readers, feel desirous of seeing a sketch of my sail

or steam raft, and further particulars respecting that, and four others which I constructed subsequently, having varied the dimensions of the floaters, and the substance of which they were composed, I will furnish them with pleasure. I remain, sir, your most obedient servant,

ALFRED CANNING.

Crown Coffee-House, Holborn, March 18, 1834.

[We shall be glad to hear again from Mr. Canning on the subject, with drawings, not only of his original model, but of his more matured plans of construction, and all illustrative particulars.—Ed.]

NOTE.—Since the article in our present number, on the great American steam-raft was in type, we have received a letter from an esteemed correspondent, from which the following is an extract: "The velocity attained was in still water. The vessel draws only 7 inches water. They expect, with another that is completing, to perform twenty-seven miles an hour."

Account of Steam Engines and their Inventors.

[Compiled from authentic sources.]

The elegant toys of Hero, the beautiful experiments of Porta and Decaus, the modifications of the Greek machine by the unknown Italian, the practical merit of the "water-commanding engine," the ingenious ideas of Hautefeuille, and their masterly extension and development by Papin, contain all the rudiments required for a perfect machine, waiting only to be touched by the wand of some mechanical magician, to form a structure of surpassing ingenuity and semi-omnipotent power.

The total neglect with which these individual schemes were regarded is not the least extraordinary circumstance in the history of the steam engine, and, above all, the oblivion which followed that of Lord Worcester, whose unconquerable perseverance, at the lowest ebb of his fortune, found means to carry his splendid ideas into practice. It appears improbable, but that his mechanism, whatever it was, was forced upon the attention of many parties connected with the draining of mines; and from the character of the Marquess, it is equally remote from belief that he would fetter the introduction of his invention into general use, by a high price asked for his permission to use it. The utter novelty of the nature and power of the agent, an ignorant and absurd idea of its danger, and the total want, probably, of any mechanical means, except that of mere strength of parts to guard against accidents,

may have been the real causes of its neglect, and exclusion from practice.

Thirty years after Lord Worcester's death, a brilliant ray of improvement suddenly bursts into the history of the steam-engine, from the consummation of the labors of a Captain Thomas Savery, who had been silently employed in combining a mechanism, in which elastic vapor was the motive power.

Of the history of this distinguished man little is known. * * *

He is first presented to our observation as an author of a scheme for rowing ships in a calm, for which, after obtaining a patent, he in vain endeavored to procure the patronage of Government. "The trial of my scheme was unjustly thwarted by one man's humor," said Savery. "A regard to my duty, as well as place, will not permit me to give a biased opinion," said the umpire. "But I have tried it," replied the projector, "on a small scale, and it answered completely." "So have we," said the servants of Government, "and in our trial it failed completely."

Savery afterwards remarked: "I was necessitated to write my book; for after I had racked my brains to find out that which a great many have spent several years in vain in the pursuit of, when I had brought it to a draught on paper, and found it approved by those commonly reputed ingenious, and receiving applause, with promises of great reward from court, if the thing would answer the end for which I proposed it; after I had, with great charge and several experiments, brought it to do beyond what I ever promised or expected myself, at last one man's humor, and more than a humor, totally obstructed the use of my engine, to my own small loss; but it is the nature of some people to decry all inventions, how serviceable soever to the public, that are not the product of their own brains."

He gave an account of it to secretary Trenchard. "A few days after, the secretary told me that the king had seen my proposals, and that I need not fear, for that the king had promised me a very considerable reward, and that I must go to the lords of the admiralty to put it in practice; but that first I must make a model of it in a wherry, which I did, and found it to answer my expectations. Then I showed a draft of it to the lords of the admiralty, who all seemed to like it, and one amongst them was pleased to say that it was the best proposal of the kind he ever saw; so I was referred from them to the commissioners of the navy, who all seemed to like it, but told me that the model must be surveyed by Mr. D——, the surveyor of the navy, whose opinion I asked; but he was very reserved, and said, 'that a wherry was too small a thing to show it in, there being no working at a capstan in a wherry;' but he told me 'it was a thing of moment, and required some time to consider on; for should I,' said he, 'give a rash judgment against it, I should injure you; or for it, the charge of putting it in practice must prove a loss to the king, and endanger my employ.'"

After four months' consideration, Dummer gave his opinion against Savery. It was neither a new nor a practicable invention, being similar to one used at Chatham, in 1682, which was abandoned, and he designated, though rather disingenuously, the capstan and its trundle as "*clock-work*;" and although Savery "exhibited his wherry on the Thames, and thousands of people were

eye-witnesses, and all people seemed to like it, the public newspapers speaking very largely of it, yet all to no purpose." (p. 18.) The inexorable lords of the admiralty were "so much altered that, from commending the thing, they would not hear one word in its defence." (p. 15.) Savery, notwithstanding, "being informed by Sir Martin Beckman, the greatest engineer in the Christian world, that the thing was good, got a noble lord to show a draft of it to the king a second time, who ordered me," says Savery, "again to the admiralty, who never ordered me in before them, but, after waiting two or three days, the doorkeeper told me that my business lay before the navy. Upon which, next day, I desired a friend of mine to go with me to the navy office, that he, being a man of extraordinary judgment, and no less reputation, might be an evidence to what discourse might happen; but coming to the navy office, we found the board was rose. However, in the hall I found Mr. D——; I asked him whether any thing was come before the board concerning my business. 'No,' said he, 'not since the objections sent to the lords of the admiralty;' on which he could not but fall into an argument. I asked him some questions in relation to his objections, and in a very little time we had a great pother about superambient air and water. I found that my sailor ran himself fast aground, as men commonly do when out of their knowledge; this, indeed, made me pity him again, although I was willing to come at the plain truth of the matter, and asked him whether or no he could not bring one hundred and fifty men to work at this engine, he answered yes; then, said I, will they not have as much power to give a ship motion as one hundred and fifty men would have on shore, at a hawser fastened to the ship; this he likewise answered in the affirmative. Then, said I, it will do more than oars, or any thing but a gale of wind, and fully answer my proposals. Well, said he, with a smile, and putting off his hat as taking leave, 'We are all submission to the lords of the admiralty.'

"Not long after, a friend of mine met a commissioner of the navy, and my friend, being perfectly acquainted with my contrivance, asked the commissioner why it was not put in use by them? The gentleman offered several objections, which were, by sound reason, fully answered by my friend, that he had only this hole to creep out at. 'Sir,' said he, 'have we not a parcel of ingenious gentlemen at the board?' 'Yes,' said my friend, 'I hope so, or five hundred pounds per annum is paid them to a fine purpose.' 'Is not Mr. D——,' said the commissioner, 'one of them, and an ingenious man?' 'I hope so,' continued my friend. 'Then,' said he, 'what have interloping people, that have no concern with us, to pretend to contrive or invent any thing for us?'"

Savery, whose bluntness, probably, was no recommendation to his application, has several flings at the "boards," and his statement is wound up by a dexterous one at the contents of courtly Dummer's wig. "Whoever is angry with truth for appearing in mean language, may as well be angry with a wise and honest man for his plain habit; for, indeed, it is as common for lies and nonsense to be disguised by a jingle of words, as a blockhead to be hid by abundance of peruke."—[Navigation Improved, p. 33.]

In the pamphlet in which Savery appeals from their judgment to that of the public, he pays less attention to the reasons urged against its novelty, as well as practicability, than they were fairly entitled to receive.* In his resentment he says, that "not a tittle will he disclose of two other inventions of his until he has justice done him on account of his rowing engine." The first of these was "a gin of fourteen inches square, portable by one man, and by which one man may lift the largest cannon into her carriage." The second contrivance was a method whereby he could fight any ship, "using charge and discharge as often as six do now, and to as much purpose, without any manner of incommodation, more than by the common way, so that one half of the men need not be exposed that now are, and the rest may be kept as a reserve for boarding; the benefit of this I leave to the ingenious sailor."†

The enthusiasm of the projector was softened in Captain Savery by the experience of a practical mechanic; and he early appears to have acquired that personal consideration which usually follows a man of genius and enterprise, when his habits are those of a man of business.

At the first announcement of his machine for raising water, he had so matured his ideas, and was so well versed in the nature and power of the motive agent, that his masterly combination has left but minor objects for improvement to succeeding engineers. His mode also of introducing his invention to the notice of the public was totally different from that which had been followed by former projectors. They enveloped every thing in mystery, and endeavored to attract attention by exaggerated statements of power or economy. His first step was to explain to every one the principles, as well as construction, of his apparatus: he showed why

* *Navigation Improved*, or the art of rowing ships of all rates, in calms, with a more easy, swift, and steady motion than oars can, by *Tho. Savery*, gent. London, 1698. In 1693 a M. Duquet made several experiments at Marseilles, at the expense of the King of France, to navigate a vessel by revolving paddles, or wheels, instead of oars. The results of these trials were very satisfactory, and strongly directed the attention of philosophers, as well as mechanics, to the practicability of this application of water-wheels.—[Machines Approuvees, tome i. p. 173.]

† Sir Isaac Newton, in a report (dated Leicesterfield, January 27, 1718,) which he made to the government, on the practicability of an invention for measuring a ship's way at sea, mentions Savery as the inventor of this machine, and notices another of his contrivances. "Mr. Savery, who invented the raising of water by fire, told me about six years ago, that he had invented an instrument to measure the distance sailed, and by his description that instrument was much like this, (the one submitted for his opinion,) the sea water driving round the lowest and swiftest wheel thereof, and that wheel driving round other wheels, the highest and lowest of which turn about an index to show the length of the way sailed."

Savery complained of one of his inventions being neglected, from its resembling a mechanism with which he was unacquainted; but Savery's one, which is now mentioned, was itself only a copy from another described by Bourne, in his inventions as produced by a Humphrey Cole. De Saumarez complains, in his turn, of Savery's scheme being remembered by Sir Isaac only to get rid of his claim. The picture he draws of his pursuits and projects is an excellent likeness of a large but harmless class—can it be named?—of simple schemers.

He was the son of De Saumarez, chaplain to Charles II.; although he was bred in Holland to learn commerce, he never applied himself to any trade or profession, but in an easy and quiet enjoyment of his small estate, in the island of Guernsey, he took his diversion in the experimental part of mathematics, his genius or inclination being that way for machines and inventions, wherein he spent about 22 years last past, confining himself to a retired sort of life, within his little laboratory; and of late he fixed his projects upon a particular invention, towards the improvement of navigation, which he could not bring forth to effect in the island, for want of able workmen; but he came to London on purpose, and he hath actually begun, and hopes, with the blessing of God, to bring it to some perfection.—[Memorial, p. 4.]

it was a cheaper power than that of horses or men; and he invited practical men to judge for themselves of the value of his assertions and statements, by an inspection of the machine itself in operation.

The influence of the court was at this period considered to be essential to the success of any speculation which required the aid of a monopoly. The profits might be diminished or overthrown by the obstacles which avarice and intrigue could then interpose in that quarter to its further progress; and from this circumstance, considerable importance was attached to having the countenance of those in power to any project in which the pecuniary risk required to be extensive; and Captain Savery might be said to be conforming to an almost common practice, when he exhibited a working model or his fire engine before King William, at Hampton court. That monarch, who himself had a mechanical turn, was so pleased with its ingenious construction and effective action, that he took a warm interest in its success, and permitted its author to inscribe to him the account which he published of his contrivance, under the title of "The Miner's Friend."

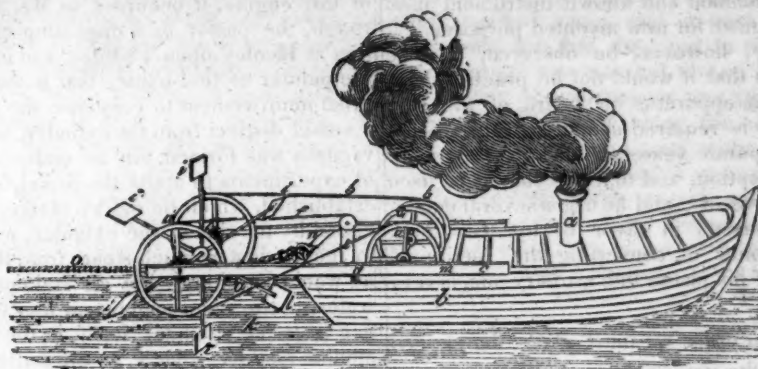
The great fame of the Royal Society, then adorned by the presidency of Sir Isaac Newton, made its opinion to be listened to with profound respect in matters of science and mechanics. To that body also Captain Savery carried his invention; and in their transactions for that year is a record of his successful experiment, made in their apartment, and a view and description of the machine forms the subject of an engraving in their annual volume.

For more perfectly illustrating the mode in which steam operates, we will suppose the vessel, represented in the following figure, to be filled with water up to the line A, and the



space E occupied with air, and having a plug or piston fitting it at C, and an aperture at D; now, if the aperture D be closed, and heat applied to the water, as at F, steam will be generated, and by its expansive force will raise the piston C upwards; then, if the heat be withdrawn, and the vessel suddenly cooled, condensation will take place, the steam, re-assuming the form of water, will again occupy the space below the line A, and the piston C will return to its place. In this experiment the expansive force of the steam compressed the air in the space E; and forced the plug C upwards, we will suppose, to H; but C, in travelling to H, displaced so much of the atmosphere as occupied the tube from C to H; consequently, the portion so displaced will seek to resume its natural position, and when the force of the steam is withdrawn by condensation, the weight of that portion of the atmosphere will again return the plug C to its place; by which it is obvious that the raising of the plug was the direct action of the steam, and the returning its consequent action, or the action of the atmosphere, in consequence of its having been displaced by the force of the steam.

Again, if we suppose the plug to be in its first situation, as at C, and we open the aperture at D, and apply heat, the steam will rise into the space E, and expel the air through the aperture D, which being closed, and condensation caused, the space E will



be left a vacuum, and the atmosphere seeking to occupy that space will force the plug C down to the line A; here the movement of the plug C was solely caused by the atmosphere exerting itself to regain the position whence it had been expelled by the force of the steam through D, and this effect is performed by the consequent power of steam alone.

It has been found by experiments, that the pressure of the atmosphere is equal to about 14 pounds weight upon every square inch, so that supposing the superficies of the aperture of the vessel, to contain one square inch, the power exerted by the steam in raising C to H will be tantamount to raising 14 pounds weight that height, together with the power necessary to overcome the friction and weight of the piston C, in the cylinder; and that the power exerted by the steam in expelling the atmosphere from the space E, and obtaining its consequent pressure to the raising of 14 pounds from A to C; and that the disposable power, obtained by the return of the piston from H, will, in the first instance, be equal to the raising of 14 pounds weight from C to H, less the amount of the friction of the piston C; and, in the second, will be equal to the raising of 14 pounds weight from C to A, less the amount of the friction as before. In both these instances the expansive or direct force of the steam has only been considered as equal to the displacing of the atmosphere, or what will be equal to 14 pounds pressure on each superficial inch; but if the piston C be loaded with any weight, the steam will, if urged with sufficient heat, raise it, always premising that the vessel is strong enough to resist the increased pressure. Suppose C to be loaded with 10 pounds of weight, the steam must be urged until its pressure is equal to 24 pounds, 10 pounds more, 14 pounds the pressure of the atmosphere on each square inch, and the resulting disposable force will be equal to 24 pounds more, the weight of C, less its friction returning to the place from where C was raised; so that, in this case, the pressure on the internal sides of the vessel, tending to burst it, will be equal to 10 pounds per square inch of the internal superficies, the remaining 14 pounds being counteracted by the pressure of the atmosphere on the external surface, which is equal to 14 pounds of the internal pressure. By this, it is evident that the direct force of steam may be increased without limits, whereas the resulting force or pressure of the atmosphere is manifestly bounded to 14 or 15 pounds on the square inch, according as its density varies.

A mode of applying the power of a steam-engine to navigate a vessel was suggested by Jonathan Hulls in 1737.* But the scheme,

although a nearer approach to the present form of the steamboat, can neither be considered as the first suggestion for moving wheels by steam, nor any improvement on the idea which emanated from another—nor even any specimen of mechanical skill, for it is awkward, clumsy, and inartificial; but, as his claims have been put forth to a higher place than is here assigned him, they will be better understood by a reference to the engraving, (see following page,) and the description of it, which follows nearly in his own words. It is doubtful whether Hulls ever proceeded beyond printing a description of his project.

"a, chimney coming from the furnace; b, tow-boat; c, c, two pieces of timber framed together to carry the machine, d; x, y, z, three wheels on one axis to receive ropes, s, t, u; t, being rope that goes into cylinder; m, n, two wheels on same axis with the fans, i, i, i; u, is a rope going from wheel, n, to z; that, when the wheels, x, y, z, move forward, moves wheel, n, forward, and the fans along with it; s, a rope going from wheel, m, to the wheel x, so that when the wheels, x, y, z, move forward, the wheel, m, draws the rope, s, and raises the weight, g, at the same time as the wheel, n, brings the fans forward.

"When the weight, g, is so raised, while the wheels, x, y, z, are moving backward, the rope, s, gives way, and the power of the weight, g, brings the wheel, m, forward, and the fans with it, so that the fans always keep going forward, notwithstanding the wheels, x, y, z, move backwards and forwards as the piston moves up and down in the cylinder: o, e, teeth for a catch to drop in from the axis, and are so contrived that they catch in an alternate manner, to cause the fans to move always forward; for the wheel, m, by the power of the weight, g, is performing its office while the other wheel, n, goes back, in order to fetch another stroke. The weight, g, must contain but half the weight of the pillar of air pressing on the piston, because the weight is raised at the same time as the wheel, n, performs its office; so that it is, in effect, two machines acting alternately by the weight of one pillar; of such a diameter as the diameter of the cylinder is." Hulls, aware that objections might be urged against its want of originality, endeavors to anticipate them: "if it should be said," says he, "that this is not a new invention, because I make use of the same power to drive my machine that others have made use of to drive theirs for other purposes, I answer, the application

* A description and draught of a new-invented machine for carrying vessels or ships out of or into any harbor, port, or river, against wind or tide; or in a calm. London, 1737. It is a pamphlet, by no means scarce, containing forty-eight pages, about eight of which have any reference to his invention. Hulls took out a patent.

of this power is no more than the application of any common and known instrument used in mechanism for new invented purposes."

It may, however, be observed, that he considers that it would not be practicable to place his apparatus on board of the ship which it is required should be moved—but that a separate vessel should be appropriated to its reception, and that this should be used as a tow-vessel; and he urges several economical reasons in favor of his *Tow-Boat*. The manner of converting the rectilinear motion of his piston into a rotary one, is very ingenious.*

Next in order we must place the experiments of the immortal James Watt.

From results, he saw that, in order to make the best use of steam, it was necessary that the cylinder should always be as hot as the steam which entered it. And also, that all the water that was formed by the condensed steam, and the injection-water likewise, should be cooled down to 100 degrees, or lower, where that was possible.

In looking to what had been done, or suggested by others, he had little to guide him in this inquiry. A rude help to his ingenuity might have been derived from some of the most common experiments with the air-pump; but at the moment when his sagacity had pointed out the direction of the path, his imagination did not enable him to follow it.

He had yielded to the difficulty, when, early in 1765, "in one of those moments when the heavenly spark of genius shone with brightness in his mind, the idea broke in upon him," that if a communication were opened between a cylinder containing steam and another vessel which was exhausted of air, the steam would immediately rush into the empty vessel, and if that were kept very cool, by an injection or otherwise, the steam would continue to enter until the whole was condensed. And if an air-tight cover were placed on the cylinder, steam might be admitted to depress the piston in a vacuum instead of the atmosphere. ADMIRABLE INVENTION!

When once the idea of separate condensation was started, minor improvements followed in quick succession. He imagined that the orifice for the piston-rod could be kept air-tight by means of a stuffing-box; and as it was obvious water could not be introduced to make the piston steam-tight, for if any of it found its way into a hot cylinder it would be converted into vapor, (as in some of his experiments,) he should employ wax and tallow as lubricating substances. He also thought that, by surrounding his cylinder with a casing of some substance which would prevent its heat from being abstracted by the circumambient air, and the air which was disengaged from the water, or found its way into the cylinder, he could extract by a pump, and by the same means he might employ the condensing vessel of the water which was produced by the injection and the condensation of the steam, or he would allow it to fall through a pipe thirty-four feet long into a pump or well, as practised by Newcomen and others. Thus, step by step, in the course of one or two days, in the eye of his mind, the exquisite conception was complete.

"About the time that Mr. Watt was en-

* About this period three fire-engines were in operation in France, one at Fresne, near Conde; one at a coal mine at Sars, near Charleroi; a third at a lead mine near Namur.—[Gensanne, p. 300, vol. ii. *Machines Approuvees*.]

gaged in bringing forward the improvement of the engine, it occurred to Mr. Gainsborough, the pastor of a dissenting congregation at Henley-upon-Thames, and brother to the painter of that name, that it would be a great improvement to condense the steam in a vessel distinct from the cylinder, where the vacuum was formed, and he undertook a set of experiments to apply the principle he had established, which he did by placing a small vessel by the side of the cylinder, which was to receive just so much steam from the boiler as would discharge the air and condensing water, in the same manner as was the practice from the cylinder itself, in the Newcomenian method—that is, by the snifting valve and sinking pipe. In this manner he used no more steam than was just necessary for that particular purpose, which, at the instant of discharging, was entirely uncommunicated with the main cylinder, so that the cylinder was kept constantly as hot as the steam could make it. Whether he closed the cylinder as Mr. Watt does, is uncertain; but his model succeeded so well, as to induce some of the Cornish adventurers to send their engineers to examine it; and their report was so favorable as to induce an intention of adopting it. This, however, was soon after Mr. Watt had his act of parliament passed for the extension of his term; and he had about the same time made proposals to the Cornish gentlemen to send his engine into that country. This necessarily brought on a competition, in which Mr. Watt succeeded; but it was asserted by Mr. Gainsborough, that the mode of condensing out of the cylinder was communicated to Mr. Watt by the officious folly of an acquaintance, who was fully informed of what Mr. Gainsborough had in hand. This circumstance, as here related, receives some confirmation by a declaration of Mr. Gainsborough, the painter, to Mr. T. More, late secretary to the Society for the Encouragement of the Arts, who gave the writer of this article the information; and it is well known that Mr. Gainsborough opposed the petition to parliament through the interest of General Conway." [Hornblower, in Gregory's *Mechanics*, p. 362, vol. ii., first edition.]—On this statement, a writer in the *Edinburgh Review* observes, "We believe and hope, for the sake of the memory of a very respectable man, that the conversation is not accurately represented. It remains upon record that Mr. T. More was examined as a witness on the trial of a cause of Bolton vs. Bull, in 1792, at which time Mr. Hornblower himself was also examined as a witness, but on the opposite side from Mr. More. Mr. M., on this occasion, was asked, whether he had read the specification of Mr. Watt's invention, and whether, in his opinion, it contained a disclosure of the principles of the steam-engine? To this question he answered, 'I am fully of opinion that it contains the principles entirely, clearly, and demonstratively.' He was then asked, 'Did you ever meet with the application of these principles before you knew of Mr. Watt's engine?' His answer was, 'I do declare I never saw the principles laid down in Mr. Watt's specification, either applied to the steam-engine previous to his taking it up, or ever read of any such thing whatever.' It is not easy to reconcile these two answers given by that gentleman on his oath, with the words that Mr. Hornblower has put into his mouth. Mr. Gainsborough's idea, whatever it was, was posterior by more than twenty years." (1)

[P. 328, vol. xiii.]—We know not if the claim which is put forth in the above extract is the same as that alluded to by the late venerable Professor Jardine. "I happened," says he, "to be tutor to Dr. Roebuck's sons at that time (when Watt was at Kinneil); I had then the pleasure of seeing the experiments on a great scale, which were carrying on. This accidental circumstance, and this opportunity, connected me so much with what was going on, that when they were completed I was asked by Mr. Watt to go with him to Berwick, when he went to give in a specification of his invention before a Master in Chancery, previous to the obtaining of a patent. And many years afterwards, when a groundless and frivolous charge was brought against Mr. Watt, by a person who claimed a share in the invention, I was called to give evidence of what I knew of this in Chancery. It is needless to add, Mr. Watt was triumphantly victorious."

The failure of both Fitch and Rumsey to carry their schemes into practice, as it had previously done in another, settled the dispute as to priority of invention in America.

Oliver Evans, about the same period, had been maturing a plan for using steam of an elasticity ten times greater than that employed in the condensing and atmospheric engines. And his proposal was further remarkable, as embracing a device to propel waggons on common roads, by a steam-engine instead of horses. "But all united," says he, "in condemning the scheme, except two gentlemen, (one of whom was a projector himself,) and indeed one, who has the name of a celebrated engineer, continued to oppose them for a long time after they were fully in operation."

One of his adversaries was a Mr. Latrobe, who uniformly opposed steamboat projects, as well as those for steam carriages. Fifteen years after this period, and three years before they were finally established, (unfortunately for his reputation,) he printed a report against their practicability. We quote it as containing some facts respecting steam navigation. "After the American Revolution, a sort of mania began to prevail, which, indeed, has not yet entirely subsided, for impelling boats by steam-engines. Dr. Franklin proposed to force forward the boat by the immediate action of the steam upon the water. Many attempts to simplify the working of the engine, and more to employ a means of dispensing with the beam in converting the libratory into a rotary motion were made. For a short time a passage-boat, rowed by a steam-engine, was established between Bordentown and Philadelphia, but it was soon laid aside. The best and most powerful steam-engine which has been employed for this purpose, (excepting, perhaps, one constructed by Dr. Kinsey, with the performance of which I am not sufficiently acquainted,) belonged to a few gentlemen of New-York. It was made to act by way of experiment upon oars, upon paddles, and upon flutter wheels; nothing in the success of these experiments appeared to be sufficient compensation for the expense, and extreme inconvenience of the steam-engine in the vessel.

"There are, indeed, general objections to the use of the steam-engine for impelling boats, from which no particular mode of application can be free. These are—1st, The weight of the engine and the fuel; 2d, The large space it occupies; 3d, The tendency of its action to rack the vessel and render it

leaky; 4th, The expense of maintenance; 5th, The irregularity of its motion, and the motion of the water in the boiler and cistern, and of the fuel vessel in rough water; 6th, The difficulty arising from the liability of the paddles or oars to break, if light, and from the weight, if made strong. Nor have I ever heard of an instance verified by other testimony than that of the inventor, of a speedy and agreeable voyage having been performed in a steamboat of any construction."

In 1786, when Evans applied to the legislature of Pennsylvania, for an exclusive right to move land-carriages by steam, "they conceived me to be deranged," says he, "because I spoke of what they thought impossible, and they refused to grant the privilege I prayed for." The authorities of Maryland, to whom he next applied, with more wisdom than their neighbors, granted his petition, on the principle that what he asked for could injure no man, and might cause him to produce something useful." But with all his perseverance, his reputation for practical knowledge, and his privilege to boot, Evans could not persuade any person of substance to think so favorably of his steam-waggon, as to furnish him with the means to try one on a common road. And the drawings and descriptions of his scheme which he sent to England, to find a patron there, produced no better result.

The history of the result of another attempt to navigate by steam, which was made in Scotland, by Mr. Patrick Miller, of Dalswinton, has been lately given to the public by his son.* Mr. Miller, in 1787, had published a description and drawings of a triple vessel, moved with wheels, and gave a short account of the properties and advantages of the invention. "In the course of his explanations, he suggested that the power of a steam-engine may be applied to move the wheels so as to give them a quicker motion, and consequently to increase that of the ship. It may readily be believed, that this hint of his intention to apply the power of steam to the wheels of his double and triple vessels was not hastily thrown out. In the course of his various experiments on the comparative velocity of his vessels, with those propelled by sails, or by ordinary oars, which had given occasion to several interesting and animating contests for superiority, he had strongly felt the necessity of employing a higher force than that of the human arm, aided as it might be by the ordinary mechanical contrivances; and in this view, various suggestions were successively adopted, and in their turn laid aside. Thus, at one time, it occurred to him that the power of horses might be usefully employed; while, at another, the aid of wind itself seemed to furnish the means of counteracting its own direct and ordinary operation. But among all the possible varieties of force, that of steam presented itself to his mind, as at once the most potent, the most certain, and the most manageable."

"In Miller's family there was at this time, as tutor to his younger children, Mr. James Taylor, who had bestowed much attention on the steam-engine, and who was in the custom of assisting Miller in his experiments on naval architecture, and the sailing of boats."

* A short narrative of facts relative to the invention and practice of steam-navigation, by the late Patrick Miller, Esq., of Dalswinton, drawn up by his eldest son. — [Edinburgh Philosophical Journal, 1824.]

One day, in the very heat of a keen and breathless contest, in which they were engaged with a boat on the Leith establishment, this individual called out to his patron, 'that they only wanted the assistance of a steam-engine to beat their opponents;' for the power of the wheels did not move the boat faster than five miles per hour. This was not lost on Miller, and it led to many discussions on the subject; and it was under very confident belief in its success, that the allusion was made to it in the book already mentioned.

"In making his first experiments, Miller deemed it advisable, in every point of view, to begin upon a small scale; yet a scale quite sufficient to determine the problem which it was his object to solve. He had constructed a very handsome double vessel, with wheels, to be used as a pleasure boat on his lake at Dalswinton, and in this little vessel he resolved to try the application of steam." On looking round for a practical engineer to execute the work, Taylor recommended a Mr. William Symington to his attention, whom he had known at school, and who had recently contrived a mode of applying the force of steam to wheel carriages; and he accompanied Miller to the house of a Mr. Gilbert Meason, in Edinburgh, to see the model. Pleased with this specimen of Symington's ingenuity, he employed him, in conjunction with his friend Taylor, to superintend the construction of a small steam-engine, to work a double or twin boat. And in the autumn of the same year, the engine, which had brass cylinders of four inches in diameter, was fixed in the pleasure-boat on Dalswinton Loch. "Nothing could be more gratifying or complete than the success of this first trial, and while for several weeks it continued to delight Miller and his numerous visitors, it afforded him the fullest assurance of the justness of his own anticipation, of the possibility of applying to the propulsion of his vessels the unlimited power of steam. On the approach of winter, the apparatus was removed from the boat and placed as a sort of trophy in his library at Dalswinton, and is still preserved by his family as a monument of the earliest instance of actual navigation by steam" in Great Britain.

Symington, in the succeeding year, was again commissioned by his patron to try the experiment on a greater scale; a double vessel, sixty feet long, was to be fitted with an engine and revolving paddles, suited to the supposed exigencies of the case. The engine and machinery were constructed at Carron, and in the course of six months the vessel was ready to be put in motion. In December, 1789, it was taken into the Forth and Clyde Canal, and in the presence of a vast number of spectators, the machinery was put in motion. "This second trial promised to be every way as prosperous as the first. It happened, unluckily, however, that the revolving paddles had not been made of sufficient strength, and when they were brought

* Mr. Miller, at various periods of his life, had embarked in many great schemes of improvement, and, among others, had expended large sums in experiments on the improvement of artillery and naval architecture. It was in the course of his speculations and experiments on the latter subject, that he was led to think of devising some mode of constructing or propelling vessels in circumstances where the ordinary resources of the nautical art were insufficient or unavailing; among these, the construction of double and triple vessels, to be moved by wheels placed in proper situations, had occurred to him, as calculated to prove of essential service, and he accordingly built and equipped several vessels of this description.

into full action, several of the float-boards were carried away, and a very vexatious stop was, for that day, put to the voyage. The damage was repaired, and on the 25th of December the steamboat was again put in motion, and carried along the canal at the rate of seven miles an hour, without any untoward accident, although it appeared evident that the weight of the engine was an overburden for the vessel, (her planking being only three quarters of an inch thick,) and that under such a strain it would have been imprudent to venture to sea. The experiment, however, was again repeated on the two following days; and having thus satisfied himself of the practicability of his scheme, he gave orders for unshipping the apparatus, and laying it up in the storehouses of the Carron Company."

"It may naturally occasion surprise and disappointment," continues his son, "that I should have to terminate here this account of my father's experiments on steam navigation; that he did not follow up these prosperous and decisive trials of its efficacy, with the same spirit and perseverance, which had been so conspicuous in many other instances, must for ever be matter of regret to his family, as it was to himself in the latter years of his life." The fact, however, was, "that he had to complain of the enormous expense in which he had been involved; and I may be permitted to add," continues his son, "that by this time my father, in the prosecution of his various schemes of a purely public nature, and without the slightest chance or expectation of reimbursement, had expended upwards of thirty thousand pounds." And, being by this time ardently engaged in agricultural pursuits, his attention was more easily turned from the objects of his former speculations, than those acquainted with his character would have been prepared to anticipate.

"Be that as it may, it cannot be anticipated that in point of fact he had fully established the practicability of propelling vessels of any size, by means of wheels or revolving paddles, and of adapting to these the powers of the steam engine, although, in the subordinate details of execution, great room remained for minor improvements.

"Of my father's peculiar and undoubted merits as an inventor, I have," continues his son, with a pardonable partiality, "endeavored to give a fair and unvarnished account; and of the reality of that invention, as carried into actual practice in the years 1788 and 1789, no demonstration more unequivocal can be desired than that, with his few but most satisfactory experiments, the prosecution of this momentous discovery remained suspended for many years, in a state of inactivity and neglect, till, at a period comparatively recent, it was revived in America, and in this country, by persons who can be proved to have derived their first lights from the experiments at Dalswinton and at Carron. But I have felt no other desire than to record the facts immediately connected with my father's operations, and to establish the priority of his claims to the credit of having originated, and carried into practical execution, an improvement in the nautical art, by far the most important of which the present age has to boast; and the ultimate effects of which, on the future intercourse of mankind, the most sanguine imagination would attempt in vain to predict."

The narrative which Mr. Miller gave of

his father's attempt to construct a steamboat, and from which we have made some copious extracts, agrees with an account of the same experiments which was given in a sketch of navigation by steam, inserted in the Supplement to the Encyclopedia Britannica.

Symington, who appears to have been more sanguine than his first patron, of the practicability of navigating vessels by steam, nearly twelve years after his experiments at Dalswinton Loch, found an opportunity to bring his scheme under the notice of a nobleman, who was zealous to encourage projects which had for their object the improvement of inland navigation. Symington, who imagined that a boat moved by wheels could be introduced with great economy, as a substitute for horses, in towing boats on canals, succeeded in inducing Lord Dundas, of Kerse, to assist him to make an experiment, on a great scale, on the Forth and Clyde Canal, with machinery, resembling in its principle that of the Dalswinton model, but modified to suit the purpose which he had more immediately in contemplation.

The result of this application, and the character of his patron, may here be noticed with reference to Symington on another account, besides its connection with a history of his experiment. From an expression in Miller's narrative, that his father was discouraged from proceeding farther from a feeling of disgust at having been involved in unnecessary expenses, an inference might be drawn unfavorable to the memory of an ingenious and worthy man.

But Miller's complaint is, in truth, a very common one; and the estimates even of the most experienced mechanics will probably continue to differ widely from the final outlay, even although those artists have been experimenting on their own means.

"Mr. Miller," says Symington, in his narrative, "being very much engaged in improving his estate in Dumfriesshire, and I also employed in constructing large machinery, for the lead mines at Wanlockhead, the idea of carrying the experiments at that time any further was entirely given up, till meeting with the late Thomas Lord Dundas, of Kerse, who wished that I would construct a steamboat for dragging vessels on the Forth and Clyde Canal, instead of horses. Agreeably to his Lordship's request, a series of experiments, which cost nearly three thousand pounds, were set on foot in 1801, and ending in 1802, upon a larger scale (than those on Dalswinton Loch) and more improved plan, having a steam cylinder twenty-two inches diameter, and four feet stroke, which proved itself very much adapted for the intended purposes. Having previously made various experiments in March, 1802, on the Forth and Clyde Canal, Lord Dundas and several other gentlemen being on board, the steam packet took in tow two loaded vessels, each of seventy tons burden, and moved with great ease through the canal, a distance of nineteen and a half miles in six hours, although the whole time it blew a strong breeze right a-head of us, so much so, that no other vessels could move to windward in the canal that day but those we had in tow, which put beyond the possibility of a doubt the utility of the scheme in canals and rivers, and ultimately in open seas. Though in this state of forwardness, it was opposed by some narrow-minded proprietors of the canal, under a very mistaken idea that the undulation of the water, occasioned by the

motion of the wheel, would wash and injure its banks. In consequence, it was with great reluctance laid up in a creek of the canal, exposed for years to public view, where Henry Bell from Glasgow, who also frequently inspected the steamboat at Carron, in 1789, did also particularly examine this."

During the time that he was engaged in this experiment, Symington received a visit from a Mr. Fulton, "who," says he, "politely made himself known, and candidly told me he was lately from North America, and intended to return thither in a few months; but having heard of our steamboat operations, he could not think of leaving the country without first waiting upon me, in expectation of seeing the boat, and procuring such information regarding it as I might be pleased to communicate. He at the same time mentioned, however advantageous such an invention might be to Great Britain, it would certainly be more so to North America, on account of the many extensive navigable rivers in that country. And as timber of the first quality for building the vessels, as also for fuel to the engines, could be purchased there at a small expense, he was decidedly of opinion it could hardly fail, in a few years, to become very beneficial to trade in that part of the world; and that his carrying the plan to North America could not turn out otherwise than to my advantage, as if I were inclined to do it, both the making and superintending of such vessels would naturally fall upon me, provided my engagements with steamboats at home did not occupy so much of my time, as to prevent me from paying any attention to those which might afterwards be constructed abroad. In compliance with his earnest request, I caused the engine fire to be lighted up, and in a short time thereafter put the steamboat in motion, and carrying him four miles on the canal, returned to the place of starting, to the great astonishment of Fulton and several gentlemen, who at our request came on board. During the above trip, Fulton asked me, 'if I had any objections to his taking notes respecting the steamboat?' to which question, I said 'none;' and after putting several pointed questions respecting the general construction and effect of the machine, which I answered in a most explicit manner, he jotted down, particularly, every thing then described, with his own remarks upon the boat;" "but he seems," says Symington, "to have been altogether forgetful of this, as, notwithstanding his fair promises, I never heard any thing more of him till reading in a newspaper an account of his death."

From these facts, the author of the sketch thinks it is very evident Symington was the first person who had the merit of successfully applying the power of the steam engine to the propulsion of vessels, and that there can be but one opinion, that, in its influence on the fate of a most ingenious man, there existed not enterprise enough in Scotland to encourage this excellent artisan to repeat his interesting and important experiments on the river Clyde.

About the time Symington had abandoned his experiments, M. Des Blanc, a watchmaker at Trevoux, had built a steamboat, and made some experiments with it on the river Soane. The first attempts were so successful as to bring forth the Marquis de Jouffroi, with his prior claim; the final result, however, was as hapless as the Marquis's.

NEW-YORK AMERICAN.

JUNE 14—20, 1834.

LITERARY NOTICES.

LETTER XXXI.*

Lexington, Kentucky, April 6th.

It was a beautiful day, that on which I left Cincinnati; and when, after crossing the Ohio at noon, I found myself upon the Kentucky bank of the river, and checked my horse to look back for a moment upon the noble town and the fair stream that bathed its walls, I could not but admit that the amphitheatre of green hills opposite to me did really shut in "The Pride of the West," if not the most beautiful city in the Union. But I confess I was not sorry to escape from its elegant and profuse hospitalities, and to find myself once more on horseback and alone, free to rove wherever fancy or caprice should lead me.—The "voice of Spring" had long been abroad in the land, and the perfume of blossoms and flowers that met my senses as I rode by the scattered gardens in the little town of Covington, seemed to rebuke the taste which had kept me so long within a city's walls. From a green knoll on the edge of the village I took my last look of the beautiful Ohio, and then pausing vainly a moment to catch the words of a song which a young girl was warbling to her piano in a pretty cottage near, I struck down the side of a grassy slope, and crossing a brook, soon found myself riding through a tall wood on the high road to Lexington. The evening soon after closing in, left me but little opportunity of observing the country, which appeared to be generally heavily wooded, and broken up into undulations so short and frequent, as to make the office of ploughing the hill-sides no sinecure. The aspect of a broken country was so agreeable to me, however, after being so long upon the prairies, that I was not sorry to find but little alteration in the scenery, when I arose and advanced upon my journey the next morning. But for the present I was no longer solitary. I had not got a hundred yards from the house where I passed the night, before I heard a voice from an enclosure near the road, calling out, "Hallo, stranger; I reckon you and I are cutting out for the same place; so hold on a bit, and you shall have some company." But before this considerate traveller could gain the road, I was overtaken by a young man of genteel appearance, who at once drew up by my side and entered into easy conversation, according to the custom of the country. After riding a mile or two together, he asked me if I would eat an apple, and, upon expressing assent, instead of drawing the fruit from his pocket, or saddlebags, as I expected, I was not a little surprised to see him stop in front of a respectable looking house, and halloo till a half a dozen negroes made their appearance from the log cabins around the door. "I say, Aunty," cried my companion to an active looking wench, who advanced before the rest, "has your master got any apples in the house?" "Only a few barrels left, young master." "Well, then, bring us a dozen." A large basket containing as many of the finest pippins as we could stow about our persons, was, a moment after, brought to the road side and held up to us, as we sat on horseback; and, after dividing the contents between us, I was very naturally about to pay for them, but the young gentleman told me that I would only insult a decent farmer's family, (not a soul of whom was known to him,) by paying for what "no Kentuckian would be brute enough to refuse a stranger."

My companion soon after parted from me, and entering a deep wood, I was so much engaged in listening to the mellow whistle of the red-bird and marking the shrubs and flowers that were putting forth their virgin blossoms around me, that I insensibly deviated from the turnpike (so called) and took a road which after an hour's riding through a romantic forest, brought me up at last by a mill, where I learnt how many miles I had wandered from the way. The beautifully secluded dell through which my path now led in recovering the main road, left me nothing to regret in having thus added to my journey. It was watered by a deep brook, along whose steep banks the red-bud and the wild plum put forth their delicate blossoms in rich profusion, and the various singing birds, which the glare of noon had driven from the

* The publication of "A Winter in the West" having been determined upon, the four intervening letters, describing the city of St. Louis, the sail up the Ohio, and the various points of interest around Cincinnati, with a sketch of the society in that beautiful town, have been reserved for publication in a more compact form.

road side and open fields far into the forest, kept here the woods alive with music.

My path, at first but little more than an Indian trail, widened at last into something like a wagon road; and I came finally to a number of log cabins, scattered along the road at some distance from each other. Near one of one, I was not a little struck at seeing an old gray-headed negro ploughing the few acres which surrounded the miserable shantee, while a stout, hale looking fellow of forty was lounging indolently in his rude and dirty doorway. It was the first object I had seen to remind me unpleasantly that I was now in a slave State.

A pretty cottage, with some shrubbery around it, stood near the spot where I regained the highway toward sunset; and near at hand was a small grave yard, protected from the road by a slight fence, with a rank growth of weeds along its border. Pausing a moment to observe the various rude memorials to the dead that reared their gray heads in the yellow sunlight, my attention was fixed by a young fair-haired girl of sixteen, kneeling by the side of a new made grave, and bending her head toward the recent sod, apparently in an attitude of prayer. Upon looking more narrowly, however, I discovered that she was only engaged in planting flowers around a spot which was probably hallowed in her affections. Her bonnet was thrown back upon her shoulders; and there was nothing to screen her features from view except the long hair, which waved in locks of gold on either side of her pensive countenance, which—so intently was she bent upon her graceful task—was only completely exposed when she raised her head, as if startled by the sound of my horse's hoofs, as I moved from the spot.

The evening had completely settled in upon the lower grounds as I looked from an eminence down into the little valley whence rose the white chimneys of the house where I was to pass the night. It stood in straggling and broken form, one story in height, on the margin of a lively brook, which rattled along the base of the hill; the various buildings comprehended in the mansion making quite an imposing appearance as they extended their low and irregular front along the road side. There was a fence of rough slabs, whitewashed, about ten feet in front of the porch, with a number of different lengths placed upright near it, to answer the double purpose of a horse block to mount from and a style to cross the fence with. A limping gray-headed negro received my horse at the door, while the landlord took my saddle-bags, and ushered me into a wainscotted and whitewashed chamber, where another traveler, who had arrived but a few minutes before me, was comforting himself with the contents of a pitcher of cider, which stood at his elbow. "Come, sir, come," he exclaimed, upon my entrance—"Come, sir, take a drink; this cider goes very well after an evening ride." "Help yourself, stranger," added the landlord, "while I tote your plunder into the other room." Then, while I joined the cider drinker in his thin potations, the landlord soon returned, and finding that my immediate destination was Lexington, he told me, with an air of great satisfaction, that "I would have company all the way, for that that gentleman was going on in the morning." The other, a plain farmer, with whom I had now exchanged some common-places about agriculture, which nearly exhausted my stock of information on that subject, rejoined with animation that he was very glad I was going his way, as "he allowed the gentleman to be right good company, and he did not mistrust but what we'd have a tip-top time of it."

The faintest streakings of dawn were hardly perceptible in the east when our horses were brought to the door the next morning; and mounting by the light of the young moon, which showed like a mere gash in the blue vesture of heaven, we moved in a brisk trot from the door of the hostelry. The twilight seemed to be losing its sombreness as we gained the top of the opposite hill; and then entering a wood of ancient beeches, the chirp of the grey squirrel, and the grating call of the ma-ma-twa, or cat-bird, impatient to commence his morning song, rivalling in sweetness the finest music of the woods, foretold the approach of day; and, indeed, the sun was already up, and the wild bee humming around the blossoms of a majestic tulip tree, as we emerged from the forest beneath its gnarled branches that extended across the road, and framed in a miniature view of cultivated country below us, whose aspect beneath the uprising sun was perfectly delicious. "Save your praises, stranger, until you get twenty miles nearer to Lexington," cried my companion, as I gave loose to my admiration and delight in no measured terms. The scenery of this part of Kentucky reminded me much of that in the eastern section of

Putnam county in the State of New York. There were the same abrupt hills, cultivated apparently to the utmost, wherever their inclination was not too great for the plough, and having all their steep places covered with a vigorous growth of forest trees, while at every interval between their bases some saucy brook would make its presence known as it capered along over the stones that paved its path to some more majestic and tranquil stream.

It was high noon when I approached the environs of Georgetown, and looked down from an eminence on the banks of the Elkhorn—a pretty winding stream about fifty yards wide—upon its beautiful race-course. It was an immense meadow of the finest and firmest turf, studded here and there with noble elms and sycamores the original growth of the forest and having two sides bounded by the river, while thickly inclosed grounds, scattered copses, or sunny slopes, waving with new wheat, gave repose to the eye upon the remaining two. The town itself looked very flourishing, and appeared to be well built, chiefly of brick; but wishing to reach Lexington early in the evening, I rode directly through it.

The country now became much more level, and the soil richer than any I had seen since crossing the Ohio. The inclosures, too, were all in better order, and I now, for the first time, saw some of those beautiful wooded pastures, which, as they are the pride of Kentucky, are peculiar, I believe, to this State. An occasional villa, embosomed in trees and shrubbery, was soon after observable. The distance at which they stood from the road indicating the taste of their proprietors in one essential point, while it left one to guess how it had displayed itself in others. The frequency of these tasteful residences continued increasing, until the collection at last assumed the appearance of a village, and finally, after travelling a few hundred yards on a M'Adamized road, I found myself riding over paved streets through the beautiful town of Lexington, the various gardens and shrubbery around the doors of the houses leading one so insensible into the business parts of the town, that you are in the heart of the place before becoming aware that you have passed the suburbs. The town, which is regularly laid out upon a level plot of ground, is well built of brick and wood, and has the sidewalks of its broad streets almost invariably lined with ornamental trees; so that, with the numerous vacant lots cultivated as gardens, and in which even thus early, the song of the mocking-bird may be heard, Lexington approaches nearer to the *rus in urbe* than any town of its size that I have seen.

Soon after entering the town, my fellow traveller drew up his horse by my side, and mentioning that "we must part here, perhaps never to meet again, stranger," he, for the first time, enquired my address with some interest, and took a very kind farewell of me. He was a plain and unpretending man, in very moderate circumstances, and spoke upon few other subjects besides religion, slavery, and the state of agriculture in Kentucky; but the attention with which I listened to the exposition of his views, while studying him as a fair representative of one of the most important classes in the community, seemed sufficiently to have won his good opinion; and I must say, that if the farmers of Kentucky are generally gifted with the same conscientiousness and moderation, with equal liberality and desire for improvement, they will compare to advantage with the cultivators of the soil in any part of the Union. Nor have I as yet, since crossing the Ohio, met with any of those "half-horse and half-alligator" characters, which flourishing for a few years on the banks of the Mississippi, have now for the most part withdrawn themselves beyond the frontiers, or live chiefly in the imagination of those who confound the wild boatmen of the western waters with the far different people who dwell upon their borders.

I am now established for a few days at Postlethwaite's Hotel in the centre of the city of Lexington, and will give you, in my next, the result of various excursions which I meditate in the neighborhood. H.

THE EARTHQUAKE IN SOUTH AMERICA.—A newspaper, brought by the Orbit, Captain Moncrieff, from Jamaica, contains some additional particulars of this dreadful calamity.

PASTO, 22d Feb. 1834.—I have to inform you that the town of Santiago, adjoining the parish of Sibundoi, situated to the east, and at the distance of 12 or 14 leagues, was built over a hidden volcano, which burst on the 20th ult. at 7 o'clock in the morning. The

earth shook so violently, that that alone ruined the ancient Rio Bamba, which may afford you some means of drawing a comparison. A run of land about 3 leagues long and 2 broad, sunk, with the forest which covered it; and its superficies presents now the aspect of a savanna, covered with stones and sand. Although the trees which covered the spot were as old as the world, there has not a root of them remained, nor even a leaf to indicate the place where they stood.

During 24 hours that the earth shook without ceasing for one instant, the town and environs were rendered a heap of ruins; the cottages of the peasants were swallowed up by the earth which yawned at every point, and the churches of Santiago and Sibundoi were ruined, and also my house, under the ruins of which I was buried. But, as if by a miracle I escaped from my sepulchre; for the same convulsion which swallowed up my house, threw it up afterwards upon the superficies of the earth, and I then managed to get out, although I was dreadfully crippled. The waves which the earth formed, rolled, in every sense of the word, similar to those of the sea, and to as great a height as happens when the ocean is enraged by a tempest. Eighty persons were swallowed up by them, with all their live stock; and the only ones that could escape were those of us who were able to run up a hill, which, although it shook as well as the rest, did not sink, neither did the waving of the earth affect it. PEDRO LEON Y LOPEZ.

FROM CANTON.—By the fast sailing ship Horatio, Capt. Howland, which sailed on the 2d of March, Canton papers have been received here dating only three and a half months back. They contain, however, but little news. The paper of the latest date says, "We hear from native authority that another disturbance has broken out amongst the hill tribes on the borders of Canton Province, near Leen-chow. Troops, it is said, have been ordered to the spot for the purpose of reducing them to submission."

The expulsion of the Catholic missionaries from Macao, appears to have been founded upon an old claim set up by the king of Portugal to permit no Roman Catholic missionaries to visit Asia, without his royal license being first obtained.

The last week has been prolific in arrivals, consisting of no less than three American vessels from England; one of them Amanda, sailed so lately as the 18th October, from London, brings only three news-papers, which contain nothing of interest. The other ships are the Alert, sailed 15th September from London and the Philip 1st from Liverpool, 30th September; the packets of neither of which are yet delivered.

Report states that a leading house in London had sent off a courier in July last, with despatches for Canton, by the overland route through Russia and Siberia, in the hope of arriving before the ships then sailing. We think it difficult to believe, however, that an undertaking so unlikely to accomplish the object in view, should have been seriously contemplated, far less attempted.

We learn that the Russian State Councillor, Foss, Secretary to the Russian Academy of Sciences, was about to set out from St. Petersburg to Peking, through the eastern Siberia, and had determined to devote three years to the journey.

Steam Communication with Suez.—We are happy to observe that effectual measures have been at length resolved upon to establish a steam communication with Suez, not only from Bombay, but also from Bengal.

The intention appears to be that four quarterly trips shall be made in the year, two by the government steamer Hugh Lindsay from Bombay, and two by the private steamer Forbes, from Calcutta.

FROM JAMAICA.—The ship Orbit, from Kingston, has brought files of papers to the 21st ult. Nothing important can be gathered from them in regard to the complexion of affairs in the English islands.

"Our accounts" says a Kingston paper of May 16th, "from the country by yesterday's post are neither flattering nor disheartening. Some correspondents dread the approach of the first of August, while others anticipate happier times. We hope the latter will not prove false prophets. It is pleasant to hear that the Police force is organizing with a greater rapidity than was expected: yet some complain of pay, &c. When the House meets, their first duty will be to settle this question."

The Despatch states, that the Marquis of Sligo was much indisposed.

H. M. ship Forte arrived at Kingston on the 14th from Barbadoes, with £90,000 sterling, all in shillings and pence, which had been transhipped from H. M. ship Belvidera. A Kingston paper of the 20th says: "The quantity of specie issued on Saturday by the Receiver General, appears to have given new life to the city. Change now being afforded, complaints will necessarily cease."

There has been a total failure of the plantain crop in Demarara.

The Legislature of Tortola have adopted resolutions expressive of their entire disapprobation of the Emancipation Act, and of the arrangements of the Government for the distribution of the compensation money.

KINGSTON, APRIL 28 to MAY 28.—Mr. Christie, and his boy, are supposed to have been drowned near Green Bay, as the boat, paddle, &c. had been found.

SPANISH TOWN, April 25.—A party of gentlemen, consisting of eight, headed by John Sterling, Esq. proceeded about one o'clock this morning, from this Town to the wood above Tulloch's Estate, and adjoining Keith Hall, the property of J. G. Vidal, Esq. in St. Thomas in the Vale, for the purpose of breaking up the haunt of a band of desperate runaways, located in the midst of that extensive wood, who have been for some time committing depredations on the adjoining properties to a very great extent, especially among the cattle. These gentlemen, after a very fatiguing search in the woods, discovered their haunt, surrounded their huts, and after a desperate resistance, succeeded in capturing ten of the gang, among whom was (by her allegation) a free woman. Several shots were fired by these brigands, and they resisted, with sword in hand, their assailants; the latter, however, as above stated, mastered them, not without being unavoidably obliged to inflict some wounds upon three or four of them. They then searched their huts and found the carcasses of four beeves cut up, and a quantity of arms, ammunition, &c. The gallant little corps having fired their huts, brought them and their booty into town.

Mr. Joseph Tyrell, has commenced an action against the Editor of the Jamaica Despatch, and laid his damages at \$5000; Mr. T. having been accused in said paper of ill-treating Mr. John Scott.

The Jamaica Advertiser of May 20, says—The quantity of Specie issued by the Receiver-General on Saturday, appears to have given new life to the city. Change being now afforded, complaints will necessarily cease.

Hector Mitchell, Esq. Mayor of Kingston, had been upset in his carriage, and considerably but not dangerously hurt.

The Ship of war Forte, Com. Pell, had arrived at Kingston from Barbadoes, with 90,000*l.* in silver, which sum arrived there in the Belvidere from England.

LATEST FROM EUROPE.—By the packet ship Orpheus, arrived at this port on Saturday, we have received our files of English papers to May the 16th. The foreign news contained in them is of trifling amount, and not very interesting in its quality.

The Cotton Market continues to disappoint mercantile expectation, and to rise under the pressure of great arrivals. The sales continued large.

A great meeting has been held in London by the dissenters, for the purpose of petitioning Parliament for an entire separation of Church and State.

Paris, it is stated, cannot be said to be tranquil.

Accident at Toulon.—In the Chamber of Deputies on Wednesday, M. Eschassieraux begged leave to remind the Chamber of an unfortunate event which took place at Toulon the day of the King's fête, when an American frigate in that port fired seven times upon a French vessel called Le Suffren, and killed two of the crew. He was inclined to think that this misfortune must have been the result of mistake or accident. As a proof of this, I shall read a letter written by the captain of the American frigate to the Maritime Prefect. It is as follows:—"Sir. It is with the profoundest regret, that on my arrival from Marseilles I learned the sad accident occasioned by the salute given by my frigate in honor of the King's fête. It is impossible for me to express what I feel upon this occasion. To understand it, I beg of you to put yourself for a moment in my situation, and I beg of you to except the most positive assurance I can give you of the profound grief of all the officers and crews of the American vessels who were at Toulon when this fatal accident happened." The letter then states, that the man whose malignance had

caused the accident had been put under arrest, and should be brought to a court martial. The captain terminates his letter by entreating, that as a testimony of the regret felt for the accident, a sum of 5,000*fr.*, which had been subscribed by the officers and crews of both the American vessels, should be given to the families of the sufferers.

"Accounts from Alexandria give the most gratifying details respecting Egypt. Mehemet Ali continues forwarding with unremitting energy the work of this interesting country's regeneration, and adopting measures to increase his revenues, and to improve his army and navy. Egypt's prosperity being entirely regulated by the Nile's foundation, and this being very irregular, the Pacha has taken the wise determination of establishing, at the point of the Delta, locks, which, by commanding the river's waters, will insure their annual rise. The beneficial results of this important undertaking are incalculable. A Polytechnic school for the formation of officers, has by his orders been established at Boulac. The Professors of Mathematics, Drawing, Natural Philosophy, &c. are Europeans.

The establishment of Railways across the Isthmus of Suez is in contemplation. A report, stating the probably advantageous results of this undertaking, has been, after his own request, submitted to the Pacha's consideration.

The Sultan seeing himself, contrary to the most formal assurances, not only abandoned by his pretended friends—the English and French—but hearing them unblushingly express the high satisfaction the conduct of the Emperor towards him had given them, has reluctantly ratified the treaty of St. Petersburg. In remuneration of the important services which, as he is taught to believe, Achmet Pacha has conferred upon his country, his Highness has granted him, for life, the revenues of the district of Bolou and Gastamboli, in Asia Minor.

FRANCE.

"Conflicts between the students who frequent the *Quinguettes* (tea-gardens,) in the quarter of Mont Parnasse, and the police, and between the populace and some soldiers of the 35th regiment, took place on Thursday last, outside the barriers, and appear, indeed, to be of hourly occurrence. Great numbers of arrests and domiciliary visits continue in Paris and throughout France. On the other hand, the Chamber of Peers daily discharge scores of prisoners against whom no evidence appears on the investigation of their cases. Dr. Gervais and the Editor of the *Messenger* having refused to go to trial on Saturday, they were condemned respectively to fines of 1000 francs, and to imprisonment for an alleged libel on the police. A new trial will be the consequence of this curious proceeding. We regret to learn that very serious apprehensions are entertained for the consequences of the first public discussion of the late melancholy events in Paris."

The late affair at Lyons.—Official returns from the Arsenal of the quantity of ammunition consumed during the six days of fighting:—2,204 cannon shot—360,000 cartridges (presumed musket)—580 kilogrammes, or nearly 1,200 English pounds of gunpowder, for mines and petards.

The National Guard of Tarbes and of twenty districts in the neighborhood of Lyons, have been dissolved.

The *Courrier de Lyons* of Tuesday states, that on Sunday last a numerous body of working-dyers assembled at a public house on the Quai de Bon Ren contée, for the purpose as it was presumed, for forming a combination for an increase of wages.—They were, however, immediately surrounded by the police, aided by strong detachments of troops, and 22 of them seized and taken to prison. A powerful sensation was created in that quarter of the town, but it does not appear that any excesses were committed.

PARIS, May 11.—The budget was voted yesterday *en masse*, by a majority of 241 against 70. The amount fixed for the general expenses, is 1,030,090,547 francs, and for the special credit allotted to public works, 27,590,000 francs, not including the supplementary credit, which Sout has demanded, and will obtain, of thirty-six millions, to increase the effective army to 420,000 men in these piping times of peace.

Cholera in Paris.—Some of the French medical journals state a certain number of cases of cholera have been met with in Paris during the last month; it does not appear, however, that they have been of great severity; indeed, from those which are given in detail, they should be disposed to say that the disease was no more than is usually met with when the weather becomes warm, and such as would not have attracted the slightest notice anterior to the irruption of the more formidable disease from the east.

GERMANY.

AMSTERDAM, MAY 6.—According to intelligence from Frankfort, dated 3d May, which we have received to-day, some disturbances took place there on the night of the 2d. Some students confined in the guard-house broke out, the soldiers fired on them, and the report having caused a great multitude to collect, many citizens fell victims to the fury of the soldiers. Ten innocent persons, it is said, were killed in this manner. Three students lost their lives, and two escaped.

LONDON, MAY 14.—A fatal affray took place at Frankfort on the 6th instant, between the populace and the armed force of the city. Three soldiers were killed, and it became necessary that the Prussian and Austrian troops should occupy the city to prevent further effusion of blood.

Extract of a letter of the 6th inst. from Frankfort:—"The unfortunate occurrences of the 3d instant have created great ferment here. The Senate, the Legislative body, the burghers, and the armed force of the town, particularly the Company of Chasseurs, cry out against one another with daily increasing acrimony. Yesterday morning, at 7 o'clock, the funeral of Frederick Schreiner, a blacksmith, who was killed before the constable's guard house, was followed to the burying-ground, which is about half a league from the town, by a very great crowd of people. In the course of the day several serious disturbances occurred at the public houses in the suburbs, in which two men were killed and several seriously wounded. Similar disorders arose in the commune of Bornheim, where also blood was shed. At nightfall a large body of Austrians entered the Zeil, the central street, and succeeded in clearing away the multitude which surrounded the guard-house, uttering desperate threats. An assembly of the burghers of Frankfort have agreed upon a petition to the Senate and Legislative body, complaining of the police, the officer of the guard, and the soldiers, who fired upon the people. It is said to have been signed by 800 of the wealthy citizens, and there is every reason to apprehend that the irritation will continue to increase until satisfaction is granted."

SPAIN AND PORTUGAL.

LONDON, 12th May.—It now turns out that the account of the embarkation of Don Carlos for England, at least at the time and in the manner described, is a fabrication. From the quarter, however, in which it was circulated, there can be no doubt that such a piece of intelligence was transmitted by the telegraph to Paris, and that the opprobrium therefore of such an infamous deception does not rest on this side of the Channel. At present the whole affair is involved in so much mystery that it is impossible even to form a conjecture of the exact origin of it, but every one in any way connected with Spain, is highly indignant at the imputation, and will not spare any trouble to bring the authors of it to light.

ARANJUEZ, MAY 5.—The treaty of alliance between England and France and the two kingdoms of the Peninsula has, probably, been already laid before the House of Commons. The details have not yet been published in this country, although some ill-defined rumors have got into circulation on the subject.

The Portuguese question may now be said to be settled, and the affairs of the Peninsula generally must henceforth lose much of the interest which has hitherto attached to them. It is true there are croakers at Aranjuez who makes themselves heard as loudly as in other places; and who seem to take a perverse delight in anticipating the horrors of a general war. The departure of M. Liebermann, the Minister of Prussia, from Madrid, without leaving behind him a *Chargé d'Affaires*, as the Neapolitan Minister had done, has served to give some color to these alarms. Among better informed people, however, it is not doubted that the northern alliance will acquiesce very quietly in the new arrangements, and, like certain ill-tempered curs, however much they may growl for a little, will only fawn the more they are beaten.

In pursuance of a new arrangement, a strong Spanish force has marched to the relief of the Portuguese General, the Baron Bernardo de Sa. Boats of draught and burden and every sort of wheel carriage to be found near the frontier has been pressed into the service of the expedition, so that we may daily expect to hear that a blow has been struck in Portugal, which if promptly followed up, will not only decide the fate of the Usurper, but with him the hopes of the pretender to the Spanish throne.

In the mean time, it is but too evident that these more vigorous measure have not been begun a single day too soon. The latest intelligence from the

seat of war in the northern provinces is far from being of a flattering description. The despatch of Quesada is understood by those who are best acquainted with the subject as little better than an apology for a very serious defeat.

LATEST FROM EUROPE.—By the Sovereign, Capt. Griswold; the Eagle, Captain Lyon; and the Henri IV., Captain Castoff,—we have received European papers to the 20th ult. With much speculation upon the affairs of the continent, they contain hardly a fact of interest enough to copy.

The dates from Paris are to May 15th. Arrests, particularly of editors, continued to be frequent.

Two extraordinary votes or credit for the War Department, amounting to about £890,000 sterling, were agreed to by the Chamber of Deputies on Tuesday; one portion of it, however, by a majority of 54 only.

Paris May 15.—The King has granted from his privy purse the sum of 10,000fr. to be distributed at Lyons amongst the innocent victims at the late riots.

The Bill introduced into the House of Commons for the repeal of the Septennial Act has been lost, but the minority was so respectable in numbers, that the passage of a similar measure at no distant day is very probable. Ministers opposed the measure.—On the subject of Portuguese affairs, Lord Palmerston stated, in answer to some questions that were put to him in the House, "that a treaty which related to the affairs of the Peninsula had been signed by the Plenipotentiaries of England, France, Spain, and Portugal, and that as soon as it should be ratified it would be laid on the table of the house; that the ratifications of three of the parties had been received in London; that the approaching arrival of the ratification of Portugal had been officially announced, and that it might be confidently expected that the vessel bearing it would reach England in a few days.

At the levee of the King of England, on the 7th ult., Captain R. F. Stockton and Lieut. Alex. Slidell, of the United States Navy, were presented by Mr. Vail, the United States Chargé d'Affaires.

The cotton market continued in a very animated state, with a gradual advance in prices.

FROM EUROPE.—By the packet ship Silas Richards, Capt. Nye, which sailed from Liverpool on the 24th ult. we have received our files of English papers up to that date.

The only news of especial interest is the decease of the true patriot and friend of liberty, General Lafayette, of which our readers will find an account on page 384.

LIVERPOOL, MAY 24.—On Thursday week the annual debate on the septennial act took place, on the motion of Mr. Tennyson. After a sharp discussion—distinguished for very little argument and very many words—the motion was lost by a majority of 50.

It is generally rumored that ministers and Mr. O'Connell have come, or are coming, to some sort of a compromise on the Irish tithe bill. It is pretty certain that Sir Francis Burdett and Lord Ebrington have communicated with the member for Dublin on this point; and it is said that Sir Henry Parnell has been employed by ministers to negotiate the matter. It is supposed that if the appropriation clause be not adopted this session, it will be left over for subsequent consideration, which, no doubt, would end in its adoption. Mr. O'Connell has just addressed a letter to the editor of the *Dublin Pilot*. Speaking of ministers, he says:—

"They have solemnly pledged the Parliament to remove 'the just complaints' of the people of Ireland. A cabinet minister—one of the first in rank, and one of the highest in talent—has publicly and unequivocally declared that the tithe system in Ireland, as it relates to the established church in its present form, 'is a just complaint.' Shall it be redressed? Alas! I fear not. But why should I fear either alternative? If this 'just complaint' be redressed, then the people of Ireland will have obtained a great, a solid, a permanent advantage. If it be not redressed, then the honest, the undimmed repealers, will, with me, point to the falsification of the Address, and, exclaiming against 'the living lie,' feel more deeply how impossible it will be to expect justice from any other than a domestic legislature. * * * For my part, I am ready to make every sacrifice to obtain the fulfilment of that promise."

The newspapers say that Mr. O'Connell is to be made Master of the Rolls in Ireland. At present, we suspect that this is a premature announcement.

If ministers will stop "agitation" by doing justice to Ireland, we do not see why the best lawyer in Ireland—which O'Connell is—should not be placed on that bench which Curran occupied.

[From the National, May 20.]

SPAIN.—A letter from Madrid, of the 17th, says: "Our President of the Council has just transmitted an official note to the Representatives of the Powers which have not yet recognized our Queen, inviting them to do so immediately, because, since the death of King Ferdinand, the Sovereigns have had ample time to convince themselves that the Spanish nation considers Isabella as Queen both *de facto* and *de jure*, and that the weak minority which is fighting in Navarre in the name of Don Carlos, is not a party, but a faction. Should this recognition not be immediately made, the President of the Council intimates to those that may refuse, that they may apply for their passports in 24 hours.

"The Foreign Ministers, doubtless, after consulting together, replied, that they expected the orders of their Cabinet on the communication which had just been addressed to them, at the same time as a copy of the Royal Statute. The Papal Nuncio, who received a similar communication, has answered to the same effect. This act of our Ministry is not public, but you may consider it as certain that it was previously discussed with the Plenipotentiaries of France and England.

"Since the treaty of offensive and defensive alliance between France, England and Portugal, has been made known here, our troops no longer content themselves with seeking in Portugal after a grotesque Pretender; they combat the Miguelites in concert with the Generals of Don Pedro.

"General Quesada, greatly mortified by his late defeat near Vittoria, has taken the field with 6,300 men, to combat Zumalacarreguy. The Government has just given orders to all the columns in Old Castile, on the banks of the Douro, and in part of Aragon, to proceed by forced marches to his assistance. Part of our garrison is gone to take up positions on the road to Burgos, and to cover the points which the other troops have left."

A courier arrived yesterday from Constantinople with the answer of Admiral Roussin to the despatch announcing his appointment as Minister of Marine.—The Admiral entreats his Majesty to permit him to retain the Embassy at Constantinople. In consequence Admiral Jacob has been appointed Minister of the Marine and the Colonies, and last night took the oath in the presence of the King. The Ordinance by which the above appointment is made appears in the *Moniteur* of this morning.

VIENNA, MAY 6.—We know for certain that the Poles are to leave Switzerland. It seems that the measures adopted by the adjacent states have rendered the Confederation much more disposed to listen to the well-founded remonstrances that have been addressed to it. In this case it acts conformably to its own interest; for what would become of its foreign commerce if all the issues were closed against it. Interest is paramount to principles, and whatever attachment to the cause of the Poles may exist even at Berne in a certain party, it must give way to necessity.

BRUSSELS, MAY 19.—The Court will go into mourning for a month, on account of the death of the Prince Royal.

The remains of the Prince will be embalmed, and deposited in the Church of St. Gudule, in the sepulchral vault of the Dukes of Brabant. It is supposed that the funeral will not take place for several days. It was at first contemplated to inter the remains of the Prince in the Cathedral of Malines, but it has been decided that they shall be transferred to Brussels.

Their Majesties saw nobody the day before yesterday. We are told it would be found difficult to form an idea of the profound affliction which they feel at the loss of the first fruit of their union. The King was obliged to make a great effort to sign some of the letters of notification laid before him by Minister for Foreign Affairs. The Ministers and several persons high in office went to Lacken, but could not be admitted. The Theatres will be closed for three days.

The sepulchral vault of the Dukes of Brabant, in the chancel of the church of St. Gudule, was opened on the 19th. Several tombs and numerous epitaphs of the ancient Dukes of Brabant were found; one in particular, of the date of 1380, in a perfect state of preservation. On the tomb was deposited an enormous silver sword, with the arms of Brabant chased on it; on another tomb is a gold vase, with the arms of Austria, containing the heart of the Archduke Er-

nest, who died Governor-General of the Netherlands at the end of the 16th century.

SUMMARY.

Dr. JONES, in a letter to Professor SILLIMAN, states that there is a colony of Gipsies in Louisiana. They were brought over by the French at an early period, and colonized. They have lost, however, their wandering gipsy habits, and attend to regular business. Their complexion is darker than the French, and they still call themselves gipsies or Egyptians.

A new Muzzle.—In the Select Council on Thursday evening last, as we learn from the Philadelphia Gazette, Mr. Meredith introduced an ordinance, calculated more effectually than those now in existence, to secure our citizens against the dangers apprehended from dogs in the summer season. It provides that after the first of July next, instead of the leather strap now used, all dogs shall be muzzled with a substantial wire basket, placed so as effectually to enclose the mouth, and prevent snapping or biting. This muzzle is believed to be much easier for the animal than the strap now used, while at the same time it is more effectual. A dog with a strap is not prevented from biting, but with the wire basket, this will be impossible, as the whole mouth is enclosed. The apertures between the wires will enable him to drink with as much facility as if he were without a muzzle. The ordinance was adopted without opposition, and promptly concurred in by the Common Council.

Some persons lately employed in quarrying stones at Guernsey, Ohio, came across the body of an Indian child completely petrified. This extraordinary specimen was found imbedded in a solid mass of rock, and has the appearance of a stone image, somewhat imperfect, to be sure, yet on the whole, a very fair outline of a young Indian—done in limestone. A small row of Indian beads (too hard originally to need petrification, we suppose) was found in the same cavity.

Large and Valuable Cargo.—The fine new ship Solon, Captain Lambert, of Portsmouth, (N. H.) for Liverpool, being her first voyage, was cleared this morning by L. Trappmann, with a cargo of 1900 bales of Cotton, weighing 618,607 pounds, and valued at \$101,151 89.—[Charleston Patriot, June 14.]

INTERESTING MEETING.—It is intended that the Jupiter shall sail for Liberia on Wednesday. Among the passengers will be the Rev. Mr. Skinner, Missionary and Physician; Mr. Searl, a graduate of Amherst College, and Mr. Finley, a graduate of Princeton, Teachers, under the patronage of the Ladies' Association of this city. Mr. Searl is also the Vice Agent of the New York City Colonization Society, charged with selecting a suitable place for locating the proposed new Colony.—Dr. Webb, from Washington, D. C. and Dr. McDowell, from Edinburgh, Physicians, in the employ of the Parent Society, will also sail in the Jupiter—together with Eunice Sharp, a colored woman of education and piety, from Vermont, who goes forth of her own accord and notion, to devote herself to the cause of education in Africa. Preparatory to the embarkation of this self-devoted band, appropriate religious services were last evening celebrated in the Brick Church, in which the congregation of the late Cedar street Church united.—An admirable address for the occasion was pronounced by the Rev. Cyrus Mason, and the concluding prayer by Rev. Dr. Young.—[Com. Advertiser of yesterday.]

Liberia Herald.—Several gentlemen connected with the type, printing, and paper business, have thought it time that the Herald should appear in a new dress. Some of the donations are as follows: E. White, 100lbs. small pica; Connor & Cooke, 100lbs. pica and a small font two line do.; G. & D. Bruce, job type, flowers, &c. Hoe & Co. three pair cases, brass rules; printing office furniture, &c. Gracie, Prime & Co. six reams medium paper; Editors Observer, two reams imperial do.—[Jour. of Com.]

Le Repareur, of Lyons, gives the following characteristic anecdote of the behavior of a French soldier during the late riots in that city:—"In the Quartier du College, just at the termination of the disastrous struggle between soldiers and citizens, one of the insurgents suddenly rushed forward, and putting his musket almost to the face of a soldier, pulled the trigger. The musket missed fire, upon which the man throwing off his jacket, knelt down, and addressing the soldier, said, 'It is now your turn—here is my breast; I am a Republican.' The soldier did not move from his ranks, nor did he offer to raise his musket, but coolly said, 'I don't know how to fire so close,' and allowed the man to depart."

The 29th Annual Report of the Trustees of the Public Schools of this City has been published, and shows gratifying results of their extensive and faithful operations. The advantage conferred upon the city by these invaluable institutions can hardly be too highly prized, or too carefully guarded and perpetuated. So excellent and efficient is the system of this Society, that its adoption, on proper modifications, may be confidently recommended to other cities and indeed to many smaller towns.

Extract from the Report of the Trustees. In the report of last year, it was stated that there were on the registers of the 26 schools, contained in the 11 buildings belonging to the society, and in the school at the Alma-house,

And of 6 primary schools, 7,034
792

Making a total of 7826
at that time under the instruction in the schools of the society. Since that period, there have been 14,214 received into, and 10,774 have left the day schools; and there are now attending them the greatly increased number, which is classed as follows:

On Registers of 11 Boys' Schools,	3354
Do. 11 Girls' do.	2795
Do. 3 Boys' and Girls' Schools	450 227
viz. No. 1, 6, and 9,	
7 primary departments,	1412 1412
17 Schools,	745 870

Boys, 5961, GPs, 5304

Showing a total of 11,255 children now belonging to the public schools in this city.

There are at this time in the employ of the public school society, 49 teachers, 28 assistant teachers, and 75 monitors—the aggregate of whose salaries for a year amount to 35,650 dollars.

The following account of the employment and improvement of the children during the past year, is too interesting not to deserve a place in every newspaper in the land.

The first class learn the alphabet, and the ninth is the highest reading class.

2259	have been promoted from 1st to 2d Class.
2343	do do 2d to 3d do
2546	do do 3d to 4th do
2525	do do 4th to 5th do
1557	do do 5th to 6th do
1621	do do 6th to 7th do
1303	do do 7th to 8th do
562	do do 8th to 9th do
1820	do to writing on paper.
3291	do to addition and subtraction.
2375	do to multiplication and division.
1143	do to the compound of 1st four rules.
714	do to reduction.
497	do to rule of three.
963	do to practice.

Of the 6826 children in the Schools, as distinguished from those that are primary, and the primary departments, there are—

1838	studying Geography.
874	do Grammar.
93	do Book-Keeping.
261	do History.
523	do Astronomy.
126	do Algebra.

[The report was signed by Peter A. Jay, President, Robert C. Cornell, Vice President, George T. Trimble, Treasurer, Lindley Murray, Secretary, and 79 Trustees.]

Sudden Death.—CHARLES BALDWIN, Esq., an eminent legal practitioner, and a highly respectable citizen, was yesterday struck by the hand of death in a manner awfully sudden and impressive. He lodged at the City Hotel, and had just seated himself, without any indication of indisposition, at the large dinner table of that establishment, when, on reaching out his hand to receive a plate that was handed to him, he fell back lifeless. The vital spark was, as if in the twinkling of an eye, totally extinct.—[Courier & Enquirer.]

More Shipwrecks.—A few days since, we published a list of ten square rigged vessels, bound from the old country to Quebec, which have been cast away this season, accompanied by the loss of 456 lives, besides all on board a bark unknown. The Montreal Gazette received last evening, adds eight more to the number of vessels, accompanied with the loss of 248 lives, making a total of eighteen vessels, and 704 lives lost!! It does seem to us, that after making all due allowances for difficult navigation, such a constant succession of disastrous shipwrecks indicates that crazy ships are employed, or

that they are commanded by incompetent men. The latest date of the loss of any of the vessels mentioned is May 10th. And yet the number lost up to that date, was nearly one-eleventh of the whole number (205) arrived prior to the 27th, (17 days later). The eight additional vessels lost are as follows:

A vessel, believed to be from Cork, and to have been wrecked near the Magdalen Islands, about the 9th May, said to have 250 emigrants on board, of whom two, the only survivors, had arrived at Charlottetown, Prince Edward Island.

Brig Patriot, Anderson, from Aberdeen for Quebec, lost at Cape Rosier, Gaspe, May 7, on lives lost.

Bark Diadem, Shears, from—, wrecked on Cape Gaspe, 7th May, all saved.

Brig Scarborough, Castle, Moey, from Hull, abandoned at sea in long. 41, 30th April, all saved by the Retreat, from Alcoa.

Brig Cherup, Welsh, from Greenock, struck on Goose Island, river St. Lawrence, 5th April, crew and passengers saved, vessel condemned and sold.

Brig Trafalgar, form St. Johns, N. B. struck on a piece of ice in the Gut of Causo, no lives lost—vessel since lowered into Arichat.

Brig Robert William Harris, Ferrie, from Liverpool, for Newfoundland and Quebec, struck on a piece of ice, 25th April and sunk in twenty minutes—crew saved after being five days in the boats.

Brig Isabella, Simpson, from Leith, went on shore at Cape Chat, in a snow storm, passengers and crew, 97 in number, all saved except the mate.

THE FUNERAL OF A GERMAN STUDENT.—I was one dark January night occupied at my writing desk, weaving a woof of historical events, crossed with a warp of fiction—or sketching some light profile of national portraiture—or endeavoring to rouse a spark of English feeling for the trampled-on country in which I could not live without being interested for it—but whether it was a volume, or a monthly or a daily "article" at which I worked is of small matter to the event by which my labors were interrupted.

A low, moaning melody was borne on the gusts which swept down the valley of the Neckar, at the opening of which the town of Heidelberg is situated. Its main street, running for a mile between the river and the mountains, formed a channel for the free passage of the dirge, for such I soon ascertained it to be. Looking from my window, I observed a lurid glow rising above the house tops and throwing its red reflection upon the snow which covered them. A waving cloud of thick smoke marked the line of the procession, the leaders of which soon appeared coming round a slight curve in the long narrow street.

I immediately knew it to be a student's funeral which thus roused with lugubrious harmony the snow enveloped dulness of the place, and sent out a crowd of youths to parade the town, many of them in costumes incongruous with the season, and not quite consistent with the scene; but the whole solemnity showing an arrangement of martial discipline which made it more than commonly impressive.

The six leaders were wrapped in dark cloaks, and stalked on some paces before the band, composed of horns, bugles, and bass instruments, whose wailing tones swelled out as the procession approached, in a strain of mingled depth and wildness. Next appeared a young man of almost gigantic height, dressed in a suit of black, with large military boots and spurs, a huge cocked hat, trimmed with white feathers, a colored scarf across the shoulders, a long white cavalry gauntlet reaching nearly to his elbows, and a drawn rapier in his hand. He was the director of the various manoeuvres, and his motions of command were obeyed along the whole moving column, whose double files, of some hundreds in number, stretched down the entire length of the main street.

All the men thus forming the living hedge at both sides carried torches, which were flourished in irregular movements, some dashing the blazing ends against the frozen snow on which they walked, producing by the mixture of flame and smoke, a strangely solemn effect of brilliancy of gloom. There were a couple of dozen of the youths dressed in the same grotesque mixture of civil and military costume as the chief captain, and who followed his comrades in regulating the march. But not a word was spoken aloud, no sound was heard throughout the peopled streets save the oppressive harmony of the dead march, in strains indescribably plaintive and original, the slow tramp of hundreds of feet, and the heavy tolling of the church bell, as the procession approached the burial ground, which was a short distance from, but not in sight of, the house I occupied.

The coffin bearers wore suitable cloaks, sombre and fitted to protect the wearer from the frosty air

and flakes of snow which were hurried on by the east wind. But at each side of the bier walked six or eight chief mourners, all bareheaded, dressed in full suits of black, with silk stockings, thin shoes, and *chapeaux de bras* under the arm! How civilization and refinement lose themselves in burlesque, thought I; and what a chance there is of those foolish followers of an absurd fashion falling victims in their turn, but to a death less glorious even than that which had sent this one to his last account!

A concentrated blaze of light, rising far above the tall and leafless trees, soon marked the spot where the mortal remains of the young duellist were lowered into the earth, while his hundred of former companions stood round in serried circles, doing honor to his obsequies. I could not withdraw from the contemplation of the scene, although it was only through the mind's eye it was evident. The whole procession had passed out of sight, with the straggling citizens of both sexes, young and old, by whom it was accompanied in solemn silence. The long street was quite abandoned, and the rays from the lamps which swung at wide intervals across, fell heavily upon the snow and the dark buildings at either side. Suddenly a loud burst of song rose upon the air. The deep harmony of hundreds of male voices was joined in the requiem, and quite overpowered the instrumental accompaniment. It was sad and solemn beyond all description. No female notes lightened the full throated harmony. Never did sorrow find a more fitting tone than in the chorus of that deep lament.

I could no longer resist the desire to mingle with the throng. An impulse of sadness hurried me resistlessly along, as the swell of the sea heaves a vessel on its silent course. I was soon at the door of the grave yard. But all was once more still. The death dirge had ceased, and the earth heap was loosely piled over the body which had taken its dark berth below. The crowd quickly began to hurry forth. In a moment or two the band appeared outside, and it struck up a new, but a not less solemn strain than before. It was one of those fine martial airs to which men move to battle, which thrill through the nerves, and call the dull or stagnant feelings to arms. Every one present seemed to feel the inspiration. The procession which was now formed had all the appearance of a military train. There was no coffin, no bier, and apparently no mourners. A tone of excited, of desperate ardor pervaded those whose measured steps so lately kept time with the melancholy music of the dirge. The horns echoed along the wood-covered hill, at the foot of which the procession now moved back towards the building of the University, and the majestic ruins of the castle above returned the bugle's notes in wild and unearthly mimicry.—The grotesque diversity of costumes worn by the students, their countenances varying from beardless animation to hair-covered ferocity, the gestures with which each man tossed his flaring torch above his head, the glittering of the sword blades here and there, the wintry harshness of the scene, the wind gusts heard at intervals in the skeleton branches of the trees, all formed a whole of combinations, each one in fierce keeping with the rest.

We,—for I had joined the crowd and felt myself identified with the ceremony—arrived at the large square of the university. Here the leaders halted the torch bearers in double ranks, at each of the four sides; and at a signal given, every one advanced towards the centre, and flung his flambeau on the earth. In a few minutes the accumulation of fiery brands formed a considerable pile; and, while a thick volume of smoke and flame rose up, and was carried rapidly down the wind, the whole assembly once more shouted a chorus of almost stunning harmony. Every one knows how the German youths are trained up to vocal music! and the effect of several hundreds, on such an occasion as this, singing in parts and without a note of discord, one of their grandest national hymns, baffles imagination and defies the pen.

It requires but little strength of fancy to believe that the spirit of patriotism rose on this union of incense and melody. It seemed emblematic of that holy desire for freedom which swells and glows in the German heart. A people imbued with a strong passion so developed cannot, I thought, be doomed to perpetual thralldom. There is a longing after a liberty that must some time find a vent and secure a triumph.

BEETHOVEN.—From La Revue Francaise.

When Beethoven was young, at the age of twenty eight, as every one knows, he was struck with deafness. But it is not equally well known that this infirmity rendered him unhappy, mortified and irritable. "O my friends," he would say in his energetic lan-

guage, "you who believe me to be obstinate, ill-natured and misanthropical, and who represent me as such, you do me great injustice. You are not aware of the secret but powerful reasons which cause me to appear such in your eyes." Beethoven declared that from his childhood he always strongly felt sentiments of benevolence towards the human race. But having become deaf, he bade adieu to the world; or if he ever mingled with his fellow men, it was to suffer—for he could not bring himself to say "Speak louder—I am deaf." He could not resolve to acknowledge the imperfection of a sense, perhaps more important to him than to any other individual, and which he once possessed in a rare state of perfection.

"I," said Beethoven, "am altogether cut off from society. I cannot listen to the conversation of my friends—to me is denied all the happiness which is usually derived from social intercourse—and when I struggle to overcome my repugnance to mingle with society, you can hardly conceive of the agony of my feelings, when some one near me listens with apparent delight to the sounds of distant music, which I cannot hear. At such times I am almost tempted to commit suicide. One thing only binds me to life. It is my extreme devotion to the art of Music. I cannot quit the world until I have produced all which I am capable of producing."

EDINBURGH.—*Strange Bed-fellow.*—About a week since, an old woman, residing in a house on the Castle-hill, was unspeakably surprised, on awaking from her night's rest, to find a strange animal lying at her back, with one of its paws laid over her shoulder. Screaming with affright, she left her bed, and seizing a towel, she beat it with all her might, when, with one bound, it sprang to the furthest corner of the room, and at length took refuge in another bed which stood in the same apartment. When the poor woman had a little recovered from her alarm, and had dissipated the idea that it was a visitor from the nether regions, she remembered that a collection of wild beasts were at present exhibiting on the Mound, and began to suspect that her lodger belonged to the number. It was discovered that one of the kangaroos had made its escape during the night, and going up to the Castle-hill, had found this poor woman's door open, and, upon examination, finding that it might be as completely accommodated beside her as in its own den in the menagerie, betook itself to rest, which, however, was broken in upon in the morning in the manner we have mentioned.

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Hudson, Columbia county, New York; }
Janu 27 28, 1833.

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The greatest care and attention has been bestowed upon the growing and saving of Seeds, and none will be sold at this establishment excepting those raised expressly for it, and by experienced seedmen; and those kinds imported which cannot be raised to perfection in this country; these are from the best houses in Europe, and may be relied upon as genuine.

It is earnestly requested whenever there are any failures hereafter, they should be represented to the subscriber; not that it is possible to obviate unfavorable seasons and circumstances, but that satisfaction may be rendered and perfection approximated.

Also—French Lucern, White Dutch Clover, White Mulberry Seed, genuine Mangel Wurtzel, Yellow Locust, Ruta Baga, and Field Turnip Seeds, well worth the attention of Farmers.

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Catalogues may be had at the Store; if sent for by mail, will be forwarded gratis. Orders solicited early, as the better notice can be done in the execution.

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INSTRUMENTS.

SURVEYING AND NAUTICAL INSTRUMENT MANUFACTORY.

EWING & HEARTT, at the sign of the Quadrant, No. 53 South street, one door north of the Union Hotel, Baltimore, beg leave to inform their friends and the public, especially Engineers, that they continue to manufacture to order and keep for sale every description of Instruments in the above branches, which they can furnish at the shortest notice, and on fair terms. Instruments repaired with care and promptitude. For proof of the high estimation on which their Surveying Instruments are held, they respectfully beg leave to tender to the public perusal, the following certificates from gentlemen of distinguished scientific attainments.

To Ewin & Heartt.—Agreeably to your request made some months since, I now offer you my opinion of the Instruments made at your establishment, for the Baltimore and Ohio Railroad Company. This opinion would have been given at a much earlier period, but was intentionally delayed, in order to afford a longer time for the trial of the Instruments, so that I could speak with the greater confidence of their merits, if such they should be found to possess.

It is with much pleasure I can now state that notwithstanding the Instruments in the service procured from our northern cities are considered good, I have a decided preference for those manufactured by you. Of the whole number manufactured for the Department of Construction, to wit: five Levels, and five of the Compasses, not one has required any repairs within the last twelve months, except from the occasional imperfection of a screw, or from accidents, to which all Instruments are liable.

They possess a firmness and stability, and at the same time a neatness and beauty of execution, which reflect much credit on the artists engaged in their construction.

I can with confidence recommend them as being worthy the notice of Companies engaged in Internal Improvements, who may require Instruments of superior workmanship.

JAMES P. STABLER,

Superintendent of Construction of the Baltimore and Ohio Railroad.

I have examined with care several Engineers' Instruments of your Manufacture, particularly Spirit Levels, and Surveyors' Compasses; and take pleasure in expressing my opinion of the excellence of the workmanship. The parts of the levels appeared well proportioned to secure facility in use, and accuracy and permanency in adjustments.

These instruments seemed to me to possess all the modern improvement of construction, of which so many have been made within these few years; and I have no doubt but they will give every satisfaction when used in the field.

WILLIAM HOWARD, U. S. Civil Engineer.

Baltimore, May 1st, 1833.

To Messrs Ewin & Heartt.—As you have asked me to give my opinion of the merits of those instruments of your manufacture which I have either used or examined, I cheerfully state that as far as my opportunities of my becoming acquainted with their qualities have gone, I have great reason to think well of the skill displayed in their construction. The neatness of their workmanship has been the subject of frequent remark by myself, and of the accuracy of their performance I have received satisfactory assurance from others, whose opinion I respect, and who have had them for a considerable time in use. The efforts you have made since your establishment in this city, to relieve us of the necessity of sending elsewhere for what we may want in our line, deserve the unqualified approbation and our warm encouragement. Wishing you all the success which your enterprise so well merits, I remain, yours, &c.

B. H. LATROBE,

Civil Engineer in the service of the Baltimore and Ohio Railroad Company.

A number of other letters are in our possession and might be introduced, but are too lengthy. We should be happy to submit them, upon application, to any person desirous of perusing the same. m28

LOCOMOTIVE ENGINES.

THE AMERICAN STEAM CARRIAGE COMPANY, OF PHILADELPHIA, respectfully inform the public, and especially Railroad and Transportation Companies, that they have become sole proprietors of certain improvements in the construction of Locomotive Engines, and other railway carriages, secured to Col. Stephen H. Long, of the United States Engineers, by letters patent from the United States, and that they are prepared to execute any orders for the construction of Locomotive Engines, Tenders, &c. with which they may be favored, and pledge themselves to a punctual compliance with any engagements they may make in reference to this line of business.

They have already in their possession the requisite apparatus for the construction of three classes of engines, viz. engines weighing four, five, and six tons.

The engines made by them will be warranted to travel at the following rates of speed, viz. a six ton engine at a speed of 15 miles per hour; a five ton engine at a speed of 18 miles per hour; a four ton engine at a speed of 22 1/2 miles per hour. Their performance in other respects will be warranted to equal that of the best English engines of the same class, with respect not only to their efficiency in the conveyance of burthens, but to their durability, and the cheapness and facility of their repairs.

The engines will be adapted to the use of anthracite coal, pine-wood, coke, or any other fuel hitherto used in locomotive engines.

The terms shall be quite as favorable, and even more moderate, than those on which engines of the same class can be procured from abroad.

All orders for engines, &c. and other communications in reference to the subject, will be addressed to the subscriber, in the city of Philadelphia, and shall receive prompt attention.

By order of the Company,

WILLIAM NORRIS, Secretary.

December 2d, 1833.

For further information on this subject see No. 49, page 772, Vol. 2, of Railroad Journal.

RAILWAY IRON.

Ninety-five tons of 1 inch by 1 inch,	Flat Bars in lengths of 14 to 15 feet counter sunk holes, ends cut at an angle of 45 degrees with splicing plates, nails to suit.
200 do. 1 1/2 do. do.	
40 do. 1 1/2 do. do.	
800 do. 2 do. do.	
800 do. 2 1/2 do. do.	
soon expected.	

250 do. of Edge Rails of 36 lbs. per yard, with the requisite chairs, keys and pins.

Wrought Iron Rims of 30, 33, and 36 inches diameter for Wheels of Railway Cars, and of 60 inches diameter for Locomotive wheels.

Axles of 2 1/2, 3, 3 1/2, 4, and 4 1/2 inches diameter for Railway Cars and Locomotives of patent iron.

The above will be sold free of duty, to State Governments and Incorporated Governments, and the Drawback taken in part payment.

A. & G. RALSTON,

9 South Front street, Philadelphia.

Models and samples of all the different kinds of Rails, Chairs, Pins, Wedges, Spikes, and Splicing Plates, in use, both in this country and Great Britain, will be exhibited to those disposed to examine them. d7lineowr

ENGINEERING AND SURVEYING INSTRUMENTS.

The subscriber manufactures all kinds of Instruments in his profession, warranted equal, if not superior, in principle of construction and workmanship to any imported or manufactured in the United States; several of which are entirely new: among which are an Improved Compass, with a Telescope attached, by which angles can be taken with or without the use of the needle, with perfect accuracy—also, a Railroad Goniometer, with two Telescopes—and a Levelling Instrument, with a Goniometer attached, particularly adapted to Railroad purposes.

WM. J. YOUNG,

Mathematical Instrument Maker, No. 9 Dock street, Philadelphia.

The following recommendations are respectfully submitted to Engineers, Surveyors, and others interested.

Baltimore, 1832.

In reply to thy inquiries respecting the Instruments manufactured by thee, now in use on the Baltimore and Ohio Railroad, I cheerfully furnish thee with the following information. The whole number of Levels now in possession of the department of construction of thy make is seven. The whole number of the "Improved Compass" is eight. These are all exclusive of the number in the service of the Engineer and Graduation Department.

Both Levels and Compasses are in good repair. They have in fact needed but little repairs, except from accidents to which all instruments of the kind are liable.

I have found that thy patterns for the levels and compasses have been preferred by my assistants generally, to any others in use, and the Improved Compass is superior to any other description of Goniometer that we have yet tried in laying the rails on this Road.

This instrument, more recently improved with a reversing telescope, in place of the vane sight, leaves the engineer scarcely any thing to desire in the formation or convenience of the Compass. It is indeed the most completely adapted to lateral angles of any simple and cheap instrument that I have yet seen, and I cannot but believe it will be preferred to all others now in use for laying off rails—and in fact, when known, I think it will be as highly appreciated for common surveying.

Respectfully thy friend,

JAMES P. STABLER, Superintendent of Construction of Baltimore and Ohio Railroad.

Philadelphia, February, 1833.

Having for the last two years made constant use of Mr. Young's "Patent Improved Compass," I can safely say I believe it to be much superior to any other instrument of the kind, now in use, and as such most cheerfully recommend it to Engineers and Surveyors.

E. H. GILL, Civil Engineer.

Germantown, February, 1833.

For a year past I have used Instruments made by Mr. W. J. Young, of Philadelphia, in which he has combined the properties of a Theodolite with the common Level.

I consider these Instruments admirably calculated for laying out Railroads, and can recommend them to the notice of Engineers as preferable to any others for that purpose.

HENRY R. CAMPBELL, Eng. Philad.,

Germantown, and Norristown Railroads

THE UNDULATING RAILWAY.

(Continued from page 373.)

The Editor of the London Mechanics' Magazine afterwards states, that.

"An Attentive Reader of the Undulating Controversy" proposes that a sum of money should be staked on the result of a trial of an undulating line. He requests us to ask, 'Whether Mr. Badnall and Mr. Cheverton have confidence enough in their respective opinions to come forward singly, or supported by their friends and advocates, and stake a sum of money on the event?' He, for one, he adds, 'would be happy to back Mr. Badnall.' The wager, our correspondent suggests, might be laid so that 'the winner should pay for the expense of the trial; which expense, in case of failure, would be merely that of laying down the rails and taking them up again, on any projected line.' The sum he names is from £1,000 to £2,000."

This challenge has brought Mr. Badnall out again, and we presume for the last time. The controversy has been conducted with good feeling on both sides. The result we shall soon know, and our readers shall very speedily be made acquainted with it.

WAGER OF £1,000.—Sir: In your "Notes and Notices" of last week, I observe a correspondent suggests that a wager might be laid between Mr. Cheverton and myself, or our friends, on the result of a trial on an undulating line. Individually, I am not in the habit of offering or accepting bets, but if Mr. Cheverton feel inclined to adopt the recommendation of your correspondent, I shall be happy, on the part of my advocates, to enter, (through the medium of your Magazine,) into an agreement with him, and if he be similarly inclined, to stake £1,000 on the result of a trial on five or ten miles of road. The stakes to be lodged in a banker's hands. I trust that the memorial which has been presented to the London and Birmingham Railway Directors may induce them and their engineer, Mr. Stephenson, to institute, as I anxiously anticipate, an impartial trial on that line of road, on their own account; in which case, if Mr. Cheverton be the winner, he will gain £1,000 without deductions. Should he prefer betting a greater sum, I shall be happy to submit his offer to those of my friends who may feel inclined to speculate.

The only sum that I, in conjunction with my partner, Mr. Stephenson, should feel disposed to win or lose, (which may be added to the stakes,) would be the expense of a dinner and wine, at the Albion Hotel, Aldersgate street, for all who have written on the subject, *pro* or *con*, in the Mechanics' Magazine—your worthy self, Sir, being President.

Yours, very obediently,
RICHARD BADNALL.

Manchester, April 7, 1834.

Riots and Murder on the Washington Rail Road.—The riot among the labourers employed on the Washington Rail road, of which we made brief mention in yesterday's *American*, it seems first assumed an appearance that attracted notice, on Sunday evening. The parties arrayed against each other are known as the *Fardowns* and the *Corkonians*. On Monday morning a body of militia hastily collected in the neighborhood, succeeded for a time in restoring apparent quietness by the arrest of a number of the rioters, but they afterwards congregated in great numbers and came to open collision. Some of the shanties, or temporary houses of the laborers, were destroyed, but the injury on that day seems to have been confined to themselves.

Yesterday morning Gen. Ch. S. Ridgely having transmitted a requisition to this city for a re-inforcement of troops, a detachment of Infantry and Riflemen, under the command of Major Finley, proceeded to the scene of the disturbance. It was composed of Captains Hickman's, Branson's and Cheves' corps of infantry, and Captains Cook's and Maguire's corps of Riflemen. The troop of horse commanded by captain Bouldin also marched on the same service.—[Baltimore American.]

Postscript.—At half past eight, last night, we

saw one of the members of the troop of horse, who had just returned to the city. He informs us that the troop arrived at the place of riot yesterday morning, in advance of Major Finley's command, and that they found the rioters pretty well tranquilized, although in the early part of the day there had been some violent passes between them. One of the rioters, who had fired at Gen. Ridgely, was shot in the mouth, and this, our informant states, was the only occasion on which fire arms were used. Major Finley's detachment arrived on the ground in the afternoon, and when our informant left, matters were apparently quiet. In the course of the contests which had already taken place, a number of shanties were burnt. Four persons, it appears, were killed in the affrays, one of whom was a female. The rioters arrested will, it is supposed, be escorted to Annapolis jail to-day.

Iron Case.—United States District Court, June 17 and 18—Judge Betts presided. The United States vs. John F. Sarchet. This was an action to recover the amount of a bond passed by the defendant to the Collector for 750 dollars, being the duty claimed at three cents per lb. on iron studs or stays, and links, imported by the defendant, but which he contended was illegal, and should have been but one cent. per lb. on the stays as castings of iron not otherwise specified, and that the links should have been admitted duty free as a non enumerated article, or at most that they were only subject to a duty of 25 per cent. ad valorem as a manufacture of iron. The Collector claimed duty on both articles as parts of iron chains, partly manufactured, and as such subject to 3 cents per lb.

Verdict.—That the links were subject only to a duty of 25 per cent. ad valorem as a manufacture of iron, and the studs to one cent. per lb., as castings of iron not otherwise specified. This verdict reduces the amount of duty claimed by the Collector nearly 75 per cent.

For the United States, Mr. Price, the District Attorney, and Mr. Philip Hamilton.

For the Defendant, Messrs. Charles Walker and D. Prescott Hall.—[Jour. Com.]

DEATH OF GENERAL LA FAYETTE.

LAFAYETTE IS NO MORE. This true patriot—this noble philanthropist—this patriarch of liberty, in many lands, weighed down with years and honors, has yielded up his valuable life, and left a place that no man breathing can be made to fill. He died in the 77th year of his age, in the full possession, up to the last moment of his existence, of all his mental faculties. He died, as we learn from an English paper, on Tuesday, the 22d of May. "During the last fifteen years of his life, he was the only individual alive who had taken a leading part, and figured in a conspicuous manner, in the event of the first revolution. His political career is so well known, that it would be hardly necessary to enter into any thing like an account of it here. Up to his last hour he retained the fullest possession of his mental faculties.—The infirmities of age had only visited his physical frame. Both he and his intimate friends had perceived many months ago that he had begun to sink. The decay of nature, however, was more rapid with him than it had threatened when its first decided symptoms became visible. The venerable General was born on the 1st of September, 1757, and consequently wanted little more than three months to complete the age of 77. The wondrous scenes in both the New World and the Old, in which the name of Lafayette was prominently distinguished, are among the most remarkable in the annals of mankind; and we may safely aver, that history does not in all her records possess a name which has passed through the searching ordeal of public opinion, even in the darkest and most tempestuous times, more pure and unsullied than his whose death we are called upon to deplore."

The English papers generally, in speaking of this event, mention it with a due sensibility to the manifold public and private virtues of the illustrious deceased. They speak of him always, however, as "good" rather than "great," the mere appendage of great events, not the moving spirit among them—a view of his

character, which will unquestionably be concurred in by the mass of mankind; for the majority of men estimate the superiority of their fellows solely by the indications of power—of power, under whatever shape it may present; itself; no matter how unequal may be its developments, or how destructive its display. What mind does not shrink before the blazing intellect of Byron—the iron ambition of Napoleon. But how few can appreciate the moral grandeur—the wonderful assemblage—the just balancing and development of good and great qualities in the character of Washington! and yet that character was as much a *phenomenon*, as singular a departure from the wonted exhibitions of human nature under its most glorious aspects as ever had a place upon the annals of mankind.—Unhappily for the best interests of the human race men always connect the idea of extravagance with ability, and moderation is ever considered the sure indication of mediocrity. The justness of Lafayette's life, the singular devotion to principle under all circumstances which marked the career of the pupil of Washington, is, viewed by this light, sufficient to abnegate his title to greatness, who was great in every thing but crime. Who rushed foremost wherever the good were up and doing in the service of mankind, and sunk into obscurity when evil men were the popular idols. The chivalric champion of Liberty, where Washington led the way: the unheard of exile when Marat and Robespierre had triumphed: the lonely recluse when the splendors of Napoleon's reign made despotism popular: and the first assertor of the people's rights when Bourbon stupidity had uncovered the chains his victories successfully gilded.

But he was not great! Why? Because he did not place the crown of Louis Philippe upon his own temples! Because after turning king-maker, and choosing that man for the head of the government he deemed most worthy, expectation has been disappointed in the pseudo-republican Bourbon? Because he was so true to his principles as to refuse a throne, or because he selected the wrong person to place upon it? By such reasoning thrones make men great, and the unworthiness of those in whom we trust is fatal to our own superiority of character. Lafayette was great—great in the only true sense of the term;—for real greatness, like a noble edifice or a perfect poem, does not exist in the eccentric display of grandeur or brilliancy in some of the details, but in the due proportion, the perfect adjustment, and consummate glory of the majestic whole.

For our own part, we can never listen with patience to those who delight in depreciating—to intimate the want of intellectual power, always does depreciate—the few nobly great men who live on the pages of the world, to teach us, when despairing of the onward destiny of our race, that there have been some who have dared to be honest, under all circumstances, and who have retained their benignity and love of mankind, when philanthropy became a reproach, and a byword. History will regard Lafayette as one of those immortal benefactors of our race, who have stretched their arms beyond one generation to embrace the children of centuries in advance—a living model of goodness in every age. There the honesty that rose to the dignity of heroism, and the moderation which in classic story would be dignified as the loftiest philosophy, will leave unquestioned the greatness of Lafayette.

NOTICE TO MANUFACTURERS.

SIMON FAIRMAN, of the village of Lansingburgh, in the county of Rensselaer, and state of New-York, has invented and put in operation a Machine for making Wrought Nails with square points. This machine will make about sixty six nails, and about forty 100 nails in a minute, and in the same proportion larger sizes, even to spikes for ships. The nail is hammered and comes from the machine completely heated to redness, that its capacity for being clenched is good and sure. One horse power is sufficient to drive one machine, and may easily be applied where such power for driving machinery is in operation. Said Fairman will make, vend and warrant machines as above, to any persons who may apply for them as soon as they may be made, and on the most reasonable terms. He also desires to sell one half of his patent right for the use of said machines throughout the United States. Any person desiring further information, or to purchase, will please to call at the machine shop of Mr. John Humphrey, in the village of Lansingburgh.—August 13, 1833. A.S. & R.M. & F.